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Canadian Woodworker Essay Competition—See Page 9

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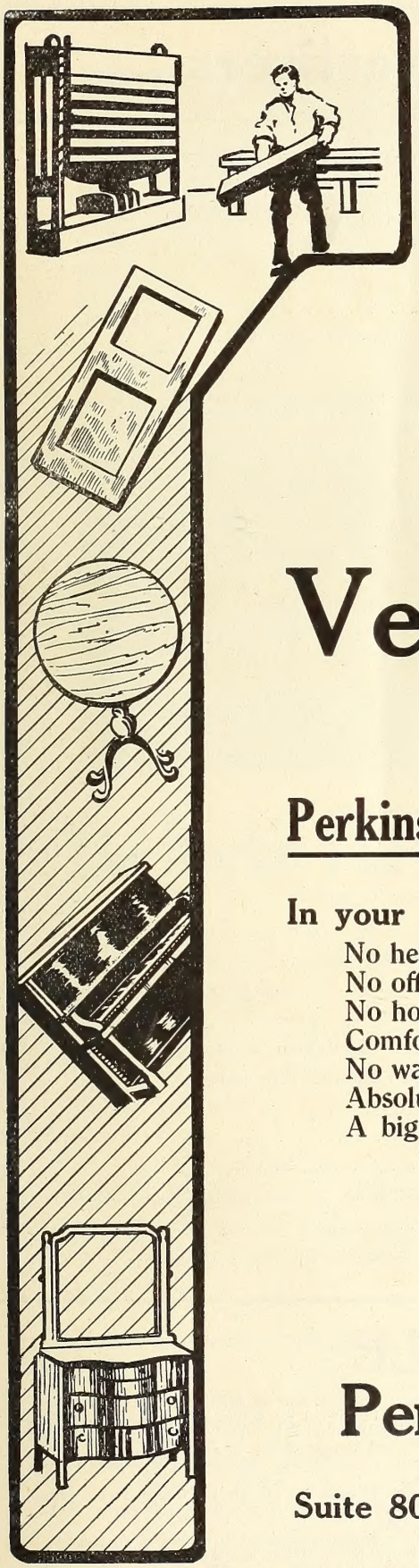

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oof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

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The Book of Lumber Shed Construction, by Met. L. Saley. Published by American Lumberman, Chicago. 176 pages, illustrated. Price $1.00.

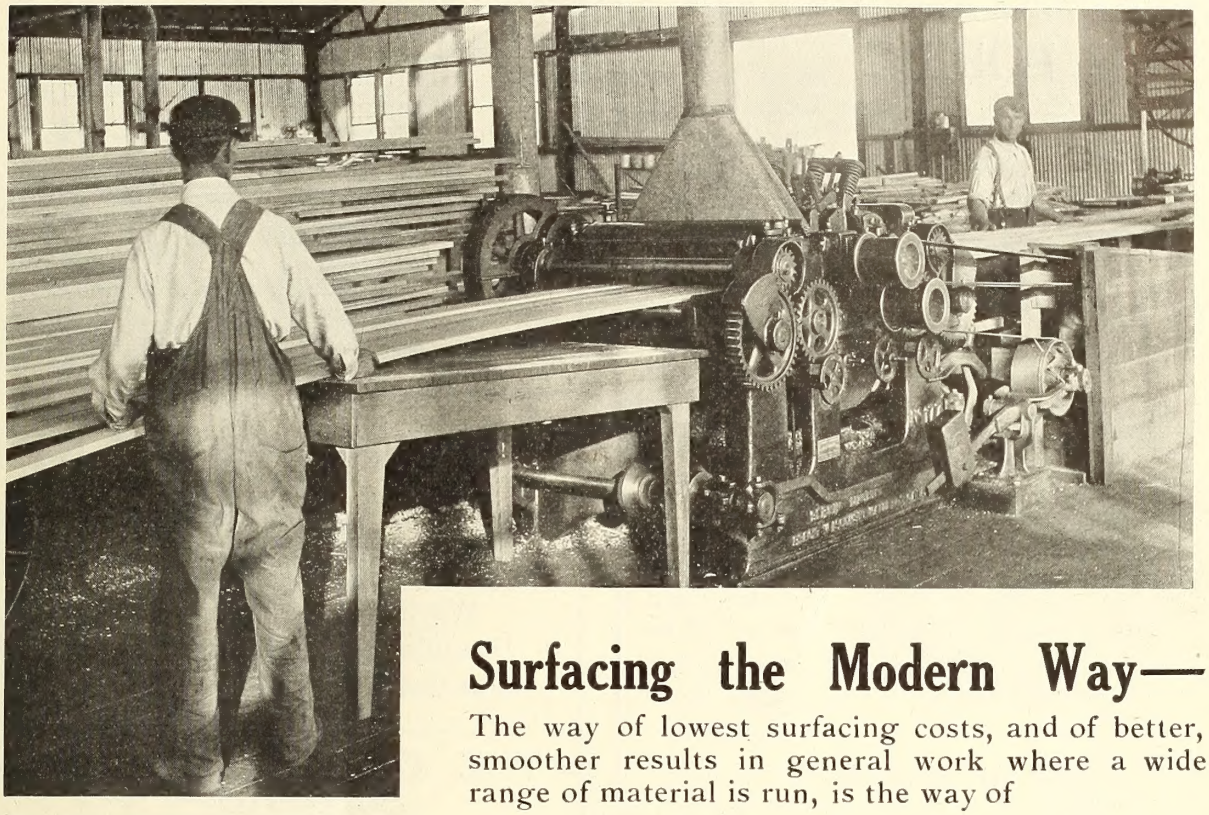
Furniture Designing and Draughting, by Alvan Crocker Nye. Published by William T. Comstock, New York. 100 pages, illustrated. Price $2.00.

Popular Mechanics Shop Notes, Published by Popular Mechanics, Chicago. Easy Ways to do Hard Things, etc. Years 1905-1906-1907-1908. Price 40c each.

Cabinet Making, by J. H. Rudd. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

MacLean Building, Toronto, Ontario



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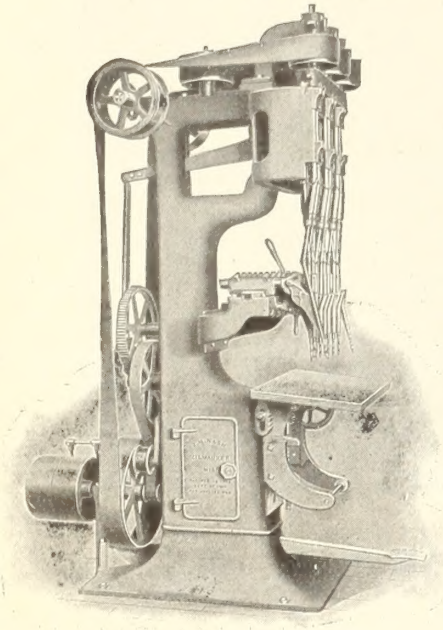

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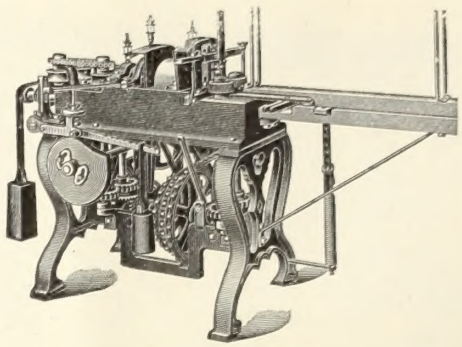

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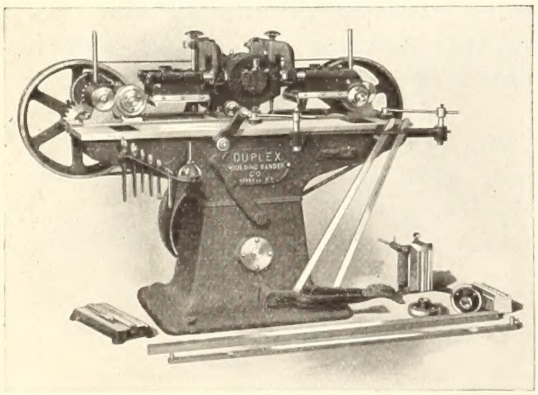

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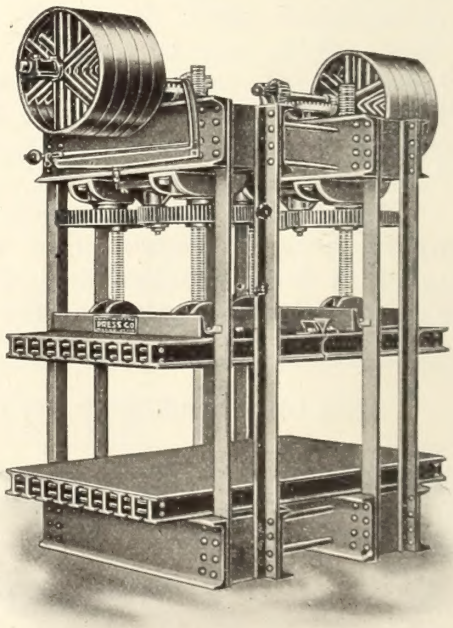

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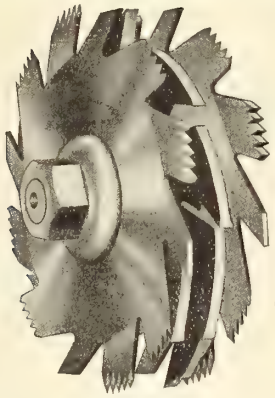

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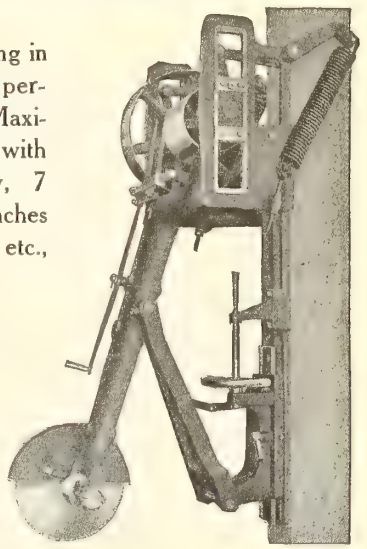

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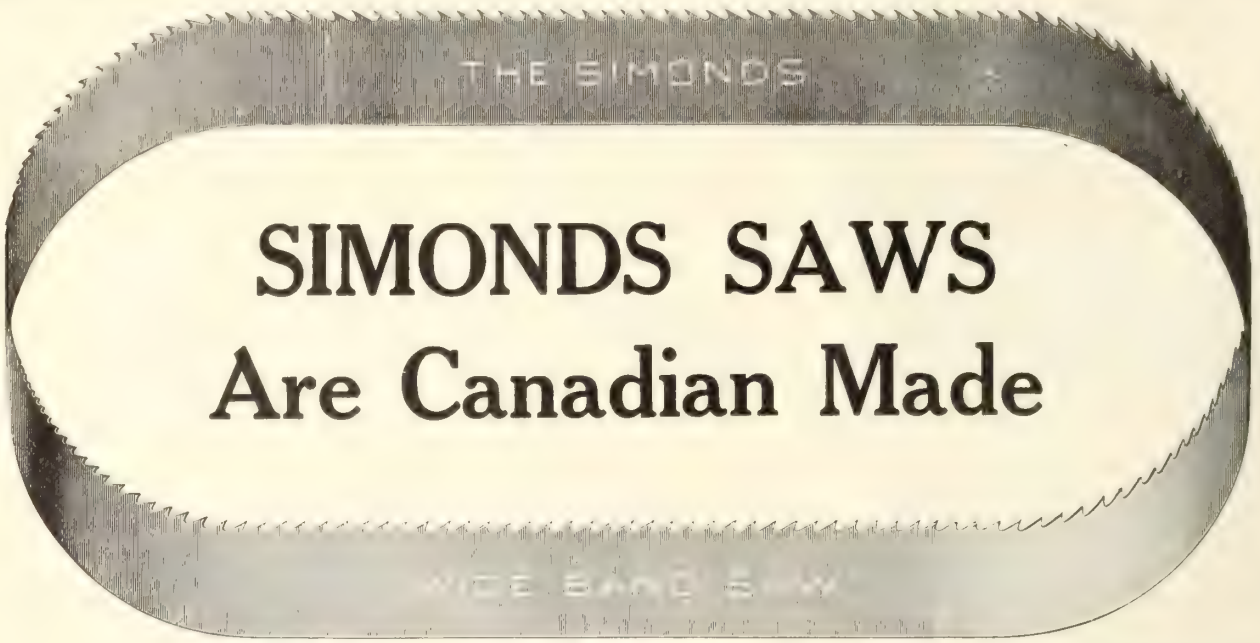

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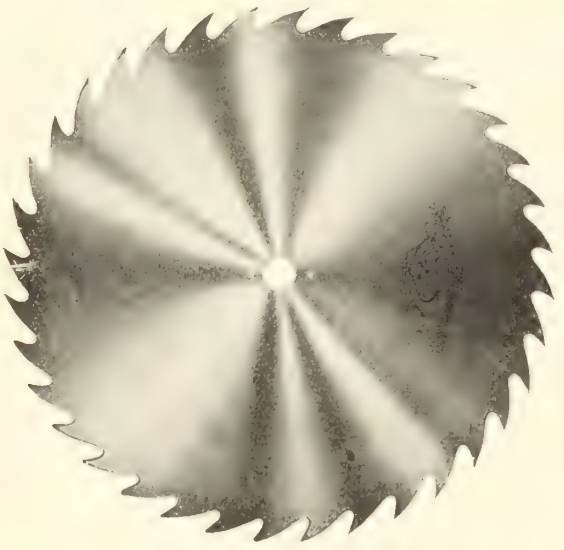
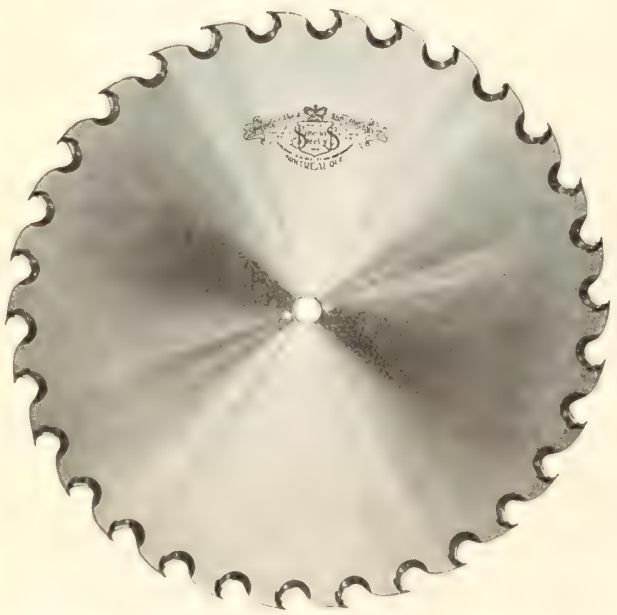
Are Canadian Made





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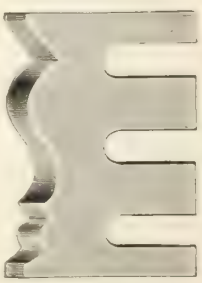

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Essay Contest No. 3 (February)

Bi-Monthly Essay Competition

Prizes to the value of Thirty Dollars are offered by the Publishers of the Canadian Woodworker for the

Best Two Essays

on

Subjects of Practical Interest to the Trade

First Prize $20 ***Second Prize $10***

The following must be regarded as the conditions of the competition:

1.—Competitors shall be engaged in some branch of practical woodworking in the Canadian trade.

2.—The subject of the essay shall be at the selection of the competitor, preference being given to topics affording a solution to some practical problem of general interest to the trade or constituting a "short cut."

3.—Drawings (if any) may be sketched roughly, in which case they will be re-drawn at the office of the Canadian Woodworker.

4.—Essays shall be written or typed on one side of the paper only, leaving ample marginal space. No definite limitation shall be placed upon the articles. The suggestion of 1,000 words is given as a guide.

5.—Articles for the February issue competition must reach the Editor not later than February 28.

6.—Awards shall be made on the basis of practical interest rather than literary merit.

7.—The decision of the publishers in the matter of awards shall be final.

8.—The publishers reserve the right to publish the articles submitted.

To the Reader

The value of such competitions as an idea-getter and as a means of promoting the efficiency of the workman cannot be gainsaid. It is reflected in the many helpful, practical articles submitted in the previous contests.

If you held off from the opening contests get in on this one. If you entered but were unsuccessful, **try again,** remembering that the secret of success in every phase of human activity is **trying again.** Practice makes perfect, and the exercise of concentration engendered now will bring results later on. The prizes are worth the winning, but whether you are successful or not you cannot fail to derive some return from the effort expended.

We are all striving for increased efficiency in the trade. If we produce better workmen, we raise the status of the industry. Let us have your co-operation. Exchange ideas. If your ideas are solid they will stand criticism; if not you should know wherein they are defective.

You know your trade well enough? Let the trade know you know it, then. It will help.

Address all communications to THE CANADIAN WOODWORKER, 345 Adelaide Street West, Toronto, marking your envelope in the lower left-hand corner, "Competition."

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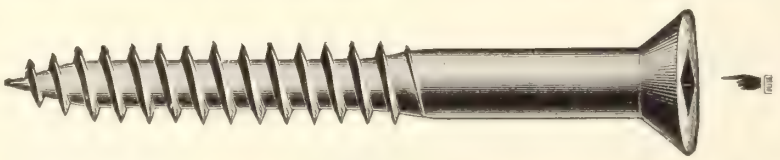
We make a specialty of Yellow Pine Structural Timber, and can furnish either Long Leaf or Short Leaf.

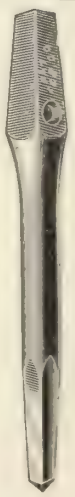
ROBERTSON SOCKET HEAD

Wood Screws



See That Square Hole

Pat. Feb. 2, 1909



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Subscription, $1.00 a year; foreign $1.50.

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Vol. 15 **January, 1915** **No. 1**

Workmen's Compensation in Ontario

A Discussion of the New Act Now in Force, with a Constructive Criticism of its Shortcomings

THE coming into operation on January 1st of the Ontario Workmen's Compensation Act suggests the discussion of a few aspects of the measure as affecting the interests represented by the Canadian Woodworker and Furniture Manufacturer.

It is most important that the Act be thoroughly understood as regards its application to the woodworking trades, for it is only by this means that an adequate grasp of its obvious imperfections can be acquired. The new system is in substitution for the common law liability. Employers covered by the Workmen's Compensation Act are no longer subject to legal action at the instance of injured workmen. Instead the workman looks to a Provincial Insurance Fund for his compensation. This fund is raised by assessments upon the various employers in the province. Employers are grouped in classes corresponding generally with certain allied lines of industry, and which group fund is intended to cover accidents which may occur to injured workmen identified with that group. The rates for a group, therefore, will fluctuate in proportion to the number of accidents.

The Act provides that compensation for injury must be paid to an employee regardless of considerations of negligence. The amount of compensation to be paid is to be determined with reference to the earnings of the workman serving under the employer by whom the compensation is payable, and is to be based upon percentages fixed by the Act. In no case is it to exceed fifty-five per cent. of the average monthly earnings of the workman. The amount is to be adjusted by a Government-appointed Commission, the fund being raised on the collective liability basis by means of a tax upon employers, in accordance with the estimated hazard associated with the respective industries,—this payment to be continued during the period of liability, and, if necessary, for life. In case of death, certain fixed monthly payments are to be made to the widow during her life, or to other dependents for varying periods.

It cannot be denied that the Act, in regard to some of these provisions, is about as drastic a piece of legislation as it is possible to conceive. One of the most important of the many phases of premium assessment is the proper actuarial basis for computing premium rates. In compensation laws there are two plans of rating: one, which may be called the capitalized plan of charging against the year's premium a sum sufficient to provide for future payments of compensation for all accidents of the year; the other, which may be called the current cost plan of merely levying each year the amount necessary to pay the year's compensation. An examination of the Act forecasts possible difficulties in the application of the assessment plan to certain of the woodworking trades.

A good deal of dissatisfaction has been expressed owing to the rates which have been assessed upon employers by the Workmen's Compensation Board. In many cases these rates are excessive. In inaugurating a system which imposes such an enormous burden on the industrial community, the Board might well have started with a much lower schedule of rates, and assessed again later in the year, if the conditions of the group insurance funds warranted such a step. In the State of Washington the Insurance Commission makes assessments monthly, or, at the longest, quarterly. A similar plan has been advocated and recommended for the Province of Ontario. In certain groups of employment, of course, the uniformity of the system would require to be departed from.

Classification as it affects the woodworking interests has an important bearing on the general question of insurance under the Act. The following industries are classified in Schedule I, employers in which are liable to contribute to the accident fund: Class I.—Saw mills, manufacture of veneer. Class 3.—Manufacture of furniture, interior woodwork, organs, pianos, piano actions, canoes, small boats, coffins, wicker and rattan ware, upholstering, manufacture of mattresses or bedsteads. Class 4.—Planing mills, sash and door factories, the manufacture of wooden and corrugated paper boxes, cheese boxes, mouldings, window and door screens, wooden toys, etc. We understand that the Workmen's Compensation Board has fixed a rate of 80c on the $100 pay-roll in respect to furniture trades.

It may be observed that the Act is on an entirely different basis from that of the old Employer's Liability law, under which employers simply insured with insurance companies against legal liability. Under

the present Act workmen are automatically compensated out of a Provincial insurance fund, receiving a substantial scale of compensation, practically irrespective of all negligence on their part. We understand that the Furniture manufacturers and other employers in Class 3 have already taken steps to organize and have made application to the Provincial Secretary for a charter. This will necessarily be followed by the drafting of rules for the prevention, as far as possible, of accidents in the factory and workshop. The approval of these rules by the Workmen's Compensation Board will then be sought, after which may be launched a vigorous campaign of accident prevention. In the woodworking trades it is essential that nothing be left undone to reduce to a minimum the accident hazard, and to this end we feel sure the combined efforts of both employer and employee will be directed. The motto should be Safety First, Last and Always.

It is to be hoped that the actual operation of the Act will disclose its many shortcomings, and that in the near future amendments will be effected so that employers engaged in the woodworking industries may escape with a minimum of injustice.

A Field for Bent-Wood Furniture

THE Department of Trade and Commerce, Ottawa, is in receipt of a number of enquiries from importers in the United States, requesting to be supplied with names of Canadian firms able to supply bent-wood chairs and other furniture. Furniture of this kind has hitherto been imported into Great Britain from Austria and Germany. During 1913 exports of these goods from Austria-Hungary totalled £911,200, of which exports to the value of £36,000 were sent to the United Kingdom. From Germany also finished hardwood, including bent-wood furniture, was exported in 1912 to the value of £209,850, the United Kingdom taking £13,000 worth of this export. With the stoppage of supplies from Austria and Germany, importers in the United Kingdom are of necessity looking to other countries as the source of supply for their requirements. It has therefore been considered possible that some Canadian firms might be prepared to offer suitable substitutes for the bent-wood furniture formerly supplied by Austria and Germany. The Department has also received an enquiry from an importer in Manchester, Eng., who had been selling bent-wood furniture to the trade for Austria, but who is now desirous to get in touch with Canadian makers. Interested firms can obtain the name and address of this importer by making application to the Department of Trade and Commerce, Ottawa, and referring to File No. A.1065.

Substituting Mahogany for Black Walnut

THE demand on the resources of black walnut is unusually heavy at the present time, owing to the greatly increased number of gun stocks in process of manufacture for the requirements of war. In an English contemporary recently a correspondent advocated the substitution of mahogany gun stocks for black walnut on the ground that the former is cheaper and is at the same time equally as good. The gun-stock problem would appear to be a rather serious one in England at the present time, and the opinion has been expressed by woodworkers that mahogany should find a place in the manufacture of gun stocks as well as walnut. Discussing this aspect of the matter the Hardwood Record points out that the employment of walnut is not a matter of fashion, but is due to qualities which make it extremely serviceable. Mahogany is an excellent wood but its principal drawback when made into gun stocks is probably its weight and low elasticity. It is about 7 lbs. per cu. ft. heavier than black walnut, but to make up for excessive weight it is about 40 per cent. stronger than walnut.

The suggestion is advanced that owing to its greater strength smaller stocks might be rendered suitable, by doing which a mahogany gun stock should be no heavier than one of walnut. One of the most important factors entering into the gun stock question would appear to be the elasticity of the wood. It is here that walnut has the decided superiority over mahogany. Weight for weight, the elasticity of black walnut is 25 per cent. greater than that of American mahogany. It is thought probable, however, that some of the African mahoganies would make a different showing.

Apart from elasticity and weight the comparison of walnut and mahogany does not show marked difference in the qualities required in gun stock material. Both are of dark color and are not easily stained. They are not liable to warp, shrink or swell after thorough seasoning. Besides, they take a high polish and have a handsome appearance.

The Australian Demand for Musical Instruments

THE number of special enquiries directed recently to the Department of Trade and Commerce, Ottawa, demonstrates that the Australian demand for piano-players has grown to considerable proportions. After special investigation one of the largest firms of musical instrument importers in Australia has decided to send an expert to Canada shortly with the object of securing an instrument which will in every respect fulfil the requirements of that country. This representative will also arrange for an exclusive purchasing agency for the territory in which he is interested. There are two piano manufacturing companies of considerable magnitude in Australia, one being located in Melbourne and the other in Sydney. The requirements of these two firms in the way of piano parts and accessories should be of interest at the present time to Canadian makers specializing in these lines. A large percentage of these requirements was imported from Germany in the past but for obvious reasons this supply is not now available. Under these circumstances there would appear to be a golden opportunity offered to Canadian manufacturers to fulfil Australian requirements, not only in the manufacture and supply of piano parts, but also of pianos and other musical instruments into which wood and cabinet work enter so largely.

According to the report of the Department of Trade and Commerce we find that the demand, though limited, is constant and also that Canadian church organs of the smaller type are well-known throughout the Commonwealth. The decline in the imports from Canada is attributed to an indisposition on the part of manufacturers in the Dominion to meet the competitive prices quoted by United States makers. We think there should be no difficulty on the part of Canadian makers to compete on equal terms with manufacturers across the border; therefore we hope that there will be a decided stimulus to exports of goods of this class from Canada to the Antipodes in the near future.

Canadian Woodworker Essay Competition

Announcement of Contest No. 3, Which Closes on the Last Day of February: A Few Pointers for Prospective Competitors—Last Month's Prize-Winners and Their Connection with the Trade

THE attention of our readers is directed to the announcement regarding the February Essay Contest, published on page 9 of this issue. The greatest interest was taken in the October and December competitions, this being evidenced by the many excellent contributions received from practical woodworkers all over the country.

Doubtless in the February competition there will be many newcomers, as this has been the history of each contest to date. For the benefit of these newcomers it may be well to emphasize the fact that the subject of the Essay is left entirely at the selection of the competitor, and that awards are made on the principle of "the greatest good to the greatest number." In other words, the articles which are of the most general practical value to woodworkers are placed in the positions of honor. Another point is that there is no actual limitation as to the length of the Essay. Our own idea is that the average practical problem in the trade can be discussed in an article of about 1,000 words, but it does not follow that serious consideration will be given to such an idea in the adjudication of the awards. The contest is essentially one of bringing out practical, helpful ideas—the kind of ideas that a man can carry directly to the bench and put into practice, the kind of ideas that make for improved methods and better work.

One or two of our friends in the furniture trade have raised the objection that they are not sufficiently skilled as draughtsmen to enter a competition in which drawing seems to figure largely. For the benefit of these and any others who may entertain such misgivings, we would point out that, with few exceptions, the drawings reproduced in the competition articles published in the last few issues of this journal, have been redrawn by members of our own staff. If illustrations are desired—as is usually the case—the competitor need do no more than prepare a rough sketch, only taking care to describe the details fully in his article. So long as he makes clear his ideas in such a way as to make the reproduction of his sketches purely a mechanical matter, he need have no concern as to the merits or demerits of his draughtsmanship.

The field of this journal, as suggested by its name, the Canadian Woodworker and Furniture Manufacturer, is a wide one and the scope of such a contest is practically unlimited. There is no reason why any one of our readers should not set to and write a discussion of his own pet hobby in the trade. We want to get into that close touch with our readers which will enable us to enter into the every-day side of their lives; we want to place in their hands a journal which is actually a part of the trade—written by the trade for the trade. Our idea is to make the Canadian Woodworker a medium between the woodworker and the bench.

And so it is that we ask our readers, whether they be former competitors or not, to turn to page 9 and read over the conditions of the contest. Those who are new to the competition will bring with them the zest which is always an important factor in success, while those who have entered before may enter again, knowing, without our assurance, that success, as a rule, is attained by those who have the ability to "keep pegging away."

For the further guidance of those who may be entering the competition for the first time it may be of interest to give the subjects of the prize-winning essays in previous contests. These are as follows:—Practical Knife-Making (First Prize Essay, October); Laying Four Veneers at One Operation (Second Prize Essay, October); Estimates and Quantities (First Prize Essay, December); Built-Up Stock Veneers With Pointers on Laying (Second Prize Essay, December).

Dundas Man Wins First Prize in Second Contest

WE have pleasure in presenting to our readers the winner of the First Prize in the December Essay Contest of the Canadian Woodworker—Mr. Kenneth McGilvray, of Dundas, Ont. The subject of the prize-winning article was "Estimates and Quantities." Concerning this

Mr. Kenneth McGilvray, of Dundas, Ont.

article, it may be of interest to furnish the following extract from the report made by the Judges to the editors of this Journal:—

"In our opinion, the article "Estimates and Quantities" is entitled to first place, as it treats thoroughly of a subject which only too often is sadly neglected in the education of the woodworker. We regard the subject as being of such importance that we would suggest that a competition based entirely upon estimating would be worth considering."

It was in no uncertain terms, then, that Mr. McGilvray was placed first in the competition. Those of our readers who read his article, which was published in our last issue, will have noticed that Mr. McGilvray must have had a broad experience in the trade, and a brief outline of his career will be found of interest.

He was born at Motherwell, near Glasgow, Scotland, in 1878. A few years later his parents removed

to the city of Glasgow, and early in life he was apprenticed to the Cabinet Shop of the Middleton Ship Yards on the Clyde. Three years later he went into house joinery with Messrs. Hamilton, Marr & Company, of Glasgow, under whom he had charge of a number of important contracts. In 1900 he was appointed Assistant Superintendent of Saw Mills and of the Building Department of a large Glasgow firm whose works were located at Port of Spain, Trinidad, B.W.I. He remained in the tropics four and one-half years, and then returned to Glasgow, and for a time was Overseer for Messrs. Skinner & Whyte, shop fitters and building contractors.

His first connection with this country was made in 1908, when he came to Halifax, N.S., to take a position in the Cabinet Shop of the Silliker Car Company, Limited. He remained in the Maritime Provinces for upwards of a year, but finding trade slack, and being of an ambitious nature, he proceeded to Hamilton, where he was employed on several public buildings for Messrs. Stuart Bros. Mr. McGilvray's present employers are the Valley City Seating Company, Limited, of Dundas. He has been with this firm three and one-half years.

Mr. McGilvray has always taken a keen interest in Technical Education, and has won a number of prizes and certificates. Among the latter is the Technological Certificate for Carpentry and Joinery (theory and practice) of the City & Guilds of London Institute. He was also awarded the Advanced Certificate of the Science and Art Department of Scottish Education for Building Construction, Drawing and Mathematics.

In Mr. McGilvray, we are glad to say, we have an ardent supporter of the trade journal. He subscribes enthusiastically to the policy of the Canadian Woodworker, which is to disseminate useful information among the trade, through the trade. He believes that none of us is too old to learn something from the other fellow. An evidence of this is found in the following reference which he makes to his extremely creditable article:—"In the future I hope to be able to improve on my present humble attempts.'

Colors to be Avoided in Woodwork

There has been some discussion amongst finishers of late regarding stains for birch and the importance of using judgment in the choice of color under certain circumstances. In this connection the opinion of a professor of manual training in a prominent University in the United States will be of interest. Replying to a series of questions regarding the use of birch this authority writes:

"I believe considerable birch is used in making school desks. During my practice I built several schools and had always to fight hard against the use of "cherry-red" desks and seats. Red is an excellent color in its place, but is vicious when used for the bed of the school desk, reflecting into the eyes of developing children the color that brings out all the worst side of their character. If you can discourage such a misuse of birch it will be doing a big service."

It will be generally agreed that the point raised is a particularly good one. There are strong dislikes on the part of many to the use of strong reds in woodwork and it is important, therefore, that efforts should be made to encourage as far as possible the use of appropriate shades such as grey and brown, particularly in the manufacture of school desks.

Mr. Albert Hudson, Hespeler, Ont., Second Prize-Winner

THE winner of the Second Prize in the December Essay Contest of this journal was Mr. Albert Hudson, of Hespeler, Ont. A native of Nottingham, Mr. Hudson was apprenticed at the age of fourteen to Messrs. Wm. Lawrence & Company, of Colwick. This firm is one of the best known woodworking concerns in the Old Country, and during the eleven years that he remained with them Mr. Hudson gained a useful practical knowledge of the various branches of his trade.

Between the ages of twenty-five and twenty-nine, Mr. Hudson held a number of responsible positions, but the lure of the West came to him, and he decided to investigate for himself what he had heard about the great possibilities of advancement in Canada. From the Old Country he got in touch with the Hespeler Furniture Company, in January, 1907, with the result that he secured an appointment with them.

At the outset Mr. Hudson appreciated the importance of adaptability; Canadian methods differed from

Mr. Albert Hudson, of Hespeler, Ont.

English, and he was prepared to start in again at the bottom, if necessary. He was not with his present employers very long before he had charge of a number of men in the Cabinet Room.

In November, 1912, Mr. Hudson took a position with the Kensington Furniture Company, of Goderich, as Foreman of their Cabinet Department, and remained with them until their plant was destroyed by fire, when he returned to his former employers.

During his apprenticeship Mr. Hudson took a technical course in woodworking at the Nottingham University, and he is well informed in all departments of furniture work; as a mechanic, however, he tells us that he prefers the Cabinet Department. Mr. Hudson is still studying, with a view to perfecting himself in the finer details of his trade. He says that he has only one regret, and that is that he did not come to Canada a few years earlier.

A dull saw causes a lot of unnecessary waste of power, but the saw that is without enough set and pinches in the cut, is the one that loads the power plant with the most unnecessary burden.

Planing Mill Costs

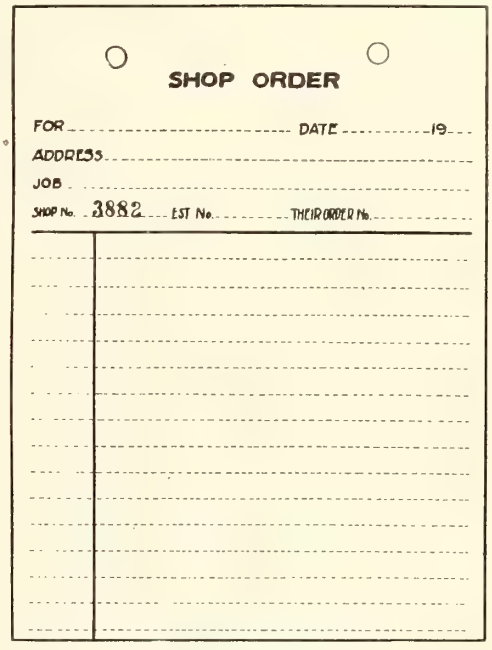
(Awarded Special Mention, Canadian Woodworker Essay Competition, No. 2)

By A. W. McKenzie, Norwood, (Winnipeg) Man.

THE statement is frequently made that cost systems are too expensive, and that the time and money spent in securing accurate data are more valuable than the information obtained. This may be true of some elaborate cost systems, but I know of no good reason why a cost system can not be installed, the expenditure of which should not prove a good investment.

The average planing mill man generally makes his price to meet competition, not knowing definitely what he is making; or he may be making on one article and losing on another. But he is satisfied if at the end of the year he has made a little money. With a fairly accurate cost system he would know what every article cost to manufacture, and where a man can lay his finger on the article or department that is not paying. It is generally possible for those in charge to put their heads together and make such changes as are necessary to manufacture these articles at a profit instead of a loss. At the present time where competition is so keen the man who knows the cost of every article and has the data on record for the use of those doing his estimating, has a decided advantage over his competitor who does a considerable amount of guessing.

The writer has seen a cost system used which works nicely for a factory employing from 50 to 75 men and which gives a valuable amount of data in compact form. First, an order or contract book (the name matters not) is used—preferably a loose leaf, so that the completed sheets can be filed in another binder. This should be ruled with first a column for the shop order number, then the quantity, description, price, extension, shipper's ticket number, and lastly a column for cost (sketch A.). This should be made in duplicate so that a memo of the items on the order or contract could be handed to the customer. This copy, however, would not require ruling. A shop order form is also required in triplicate. This shop order or job card (as it is combined) is numbered. The first copy we will call B, the second C, and the third D. Each bears the same number. Copy B is kept in the office and filed; copy C goes to the shop foreman for reference and when the article is completed it goes


SHOP ORDER

FOR ..... DATE ..... 19...

ADDRESS .....

JOB .....

SHOP No. 3882 EST No. ..... THEIR ORDER No. .....

B.—Shop order card.

to the shipper. It also goes to the foreman who makes out the cutting bill on back and then passes it to the cutting department. From there it is passed on to the machines, then to the benches and so on until the article is complete. The foreman then passes it to the office where the cost clerk figures up the material from the cutting bill on the back. He then adds a reason-

CONTRACT OR ORDER

No _____

Eureka Sash & Door Co.

VANCOUVER

_____ 191___

Mr _____

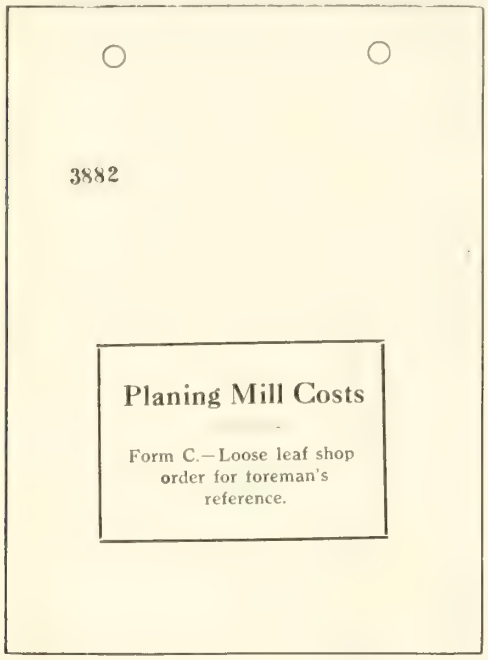
Job _____

SHOP ORDER	No. Pcs	DESCRIPTION	PRICE	AMOUNT	SHIPPER	COST.
145	4	Box wdw Frames 3'-0x6'-0"-pine	4 00	16 00	1007	12 00
		1¾ wdws, Stock detail.				
	3	O.S. Door Frms 3'-0x7'-0"-pine	3 50	10 50		
		Oak sill Stock Detail.				

A.—Specimen loose leaf from Order or Contract Book.

able percentage for waste which with the cutting bill should give the actual amount of material used in the articles contained on the face of the order.

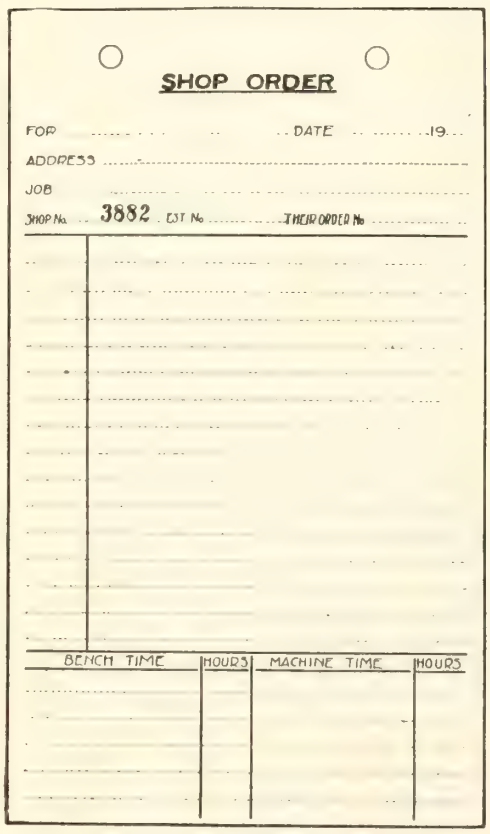
The percentage of waste can be found by taking a certain quantity of lumber into the factory, say 20,000



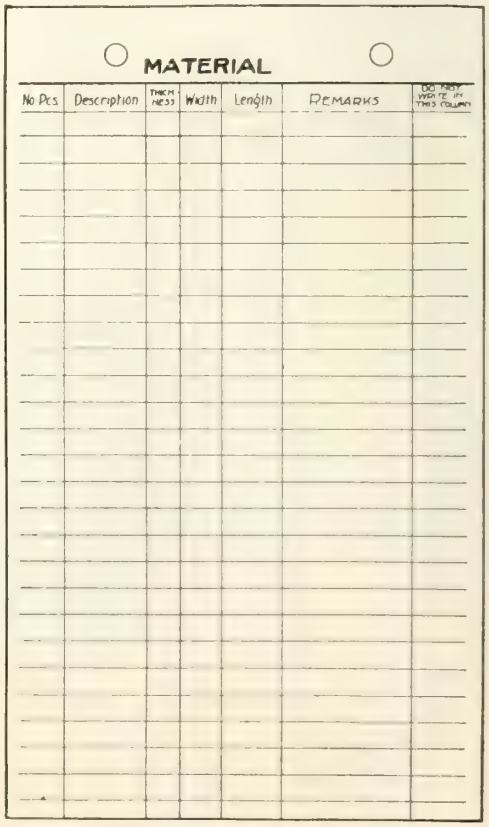
ft., and cutting it up to the cutting orders. Then figure up, and the difference between that found on the cutting bills and that taken into the factory will give the percentage of waste. This should be done frequently so that the percentage allowed for waste is fairly accurate.

To explain the balance of the system we will go back to the contract or order book. When it is desired to order an article on this contract a shop order is made out. Any number of articles can be put on this shop order so long as they are similar, and for the same department. The number on the shop order is marked in the column for the purpose in the order book (A) and opposite each item contained on the shop order, so that anybody can see at a glance which articles are on order in the factory. When the article is shipped the number of the shipper's delivery ticket is also marked in the order book (A) in the column for the purpose and also opposite each item that has been shipped.

Each man in the shop has a daily time sheet and when he is finished with or leaves an order he marks the shop order number on his time sheet and the amount of time opposite it. If he works on a dozen different jobs in a day he makes his shop order, number and time, and this time sheet can be checked up with his time on the time clock, as they both must tally, and the workman knowing that is apt to be more careful about his time. The time sheets along with the completed shop order (D) are passed into the office every day, and the cost clerk takes the time from these sheets and marks it on the respective job card. Then he figures it up and adds the proper percentage for non-productive labor, also overhead charges. Thus the material and the time, with the cost of each, are all on the same job card (D). In case the card becomes crowded another blank card can be fastened to it with a good paper fastener. Then the hardware or finishing material, if any, can be had from the orders in the stores department, as no hardware or other special material should be used for any



Form D.—Completed shop order.



Form E.—The reverse side of D.

job without issuing an order for it so that a proper record may be kept. Thus with all time and material on the job card (D) figured up—and the amount entered in the proper column on the order sheet (A), the superintendent or manager can see on looking over the sheet just what articles are on order in the shop, what articles are shipped, and what they cost. When the total contract is complete the items are added up and the profit or loss on the job is shown. As this book contains the figures only it is necessary to file the job cards away for reference or detailed information. By following up a system of this kind an accurate and inexpensive cost system could be used which would give reliable and valuable information.

The Care of Adjusting Gears

(Submitted in Canadian Woodworker Essay Competition, No. 2)

By Leonard A. Blake, Toronto

IN some shops the machine hands never work harder than when they are setting their machines. Whether planer, sticker, or jointer they have to exert the maximum of energy to turn the adjusting screws owing to dirt and lack of lubrication of the gears and screws.

Of machine men there may be said to be three grades. First is the one who oils cutter spindle bearings, feed works and set works regularly. Second, the one who attends only to spindle bearings and feedworks. The third oils only the high-speed bearings which would give notice of non-lubrication by overheating. He may sometimes remember the feedworks should they begin to squeal.

The first man takes longer oiling and uses more oil, but he will get more actual work every hour that his machine is running since his feed works run well, and he will lose less time on set-ups because his adjustments work freely.

The second man makes an equal output on running time, but takes longer setting up, while the third loses more time both in setting and in running than he

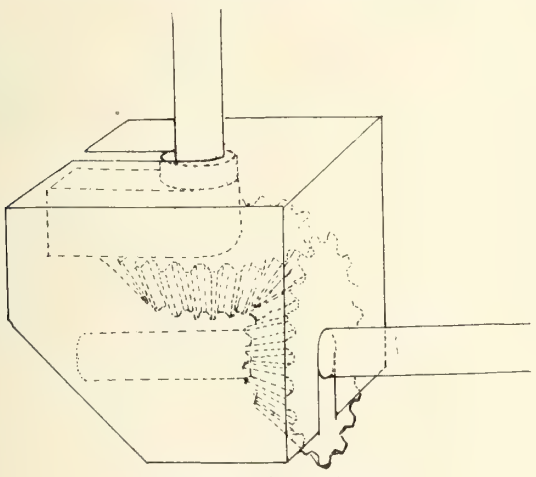


Fig. 1.—Cover for bevel gears.

saved by missing the low-speed bearings with the oil can.

It is, of course, hard to keep dust and dirt out of the holes and corners of a machine, even when there is an exhaust system, but much can be done to protect screws and gears of set works. With a view to affording some adaptable suggestions, the writer has given herewith two sketches showing methods of keeping screws and gears in some degree of freedom from dirt, at any rate from solid matter.

Fig. 1 shows a covering of sheet metal for bevel gears usually employed to move the beds of stickers and planers. This cover is easily slipped on and off, and is held in position by a wire hook back of the vertical shaft.

Fig. 2 illustrates a device with a double purpose. It consists of a piece of cotton waste wrapped around the adjusting screw, say of a sticker side head, at the

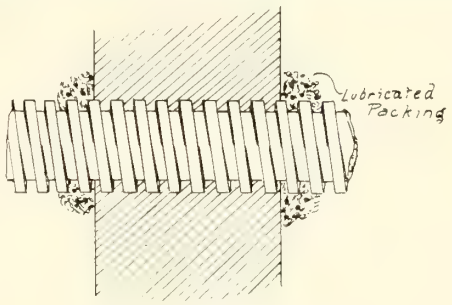


Fig. 2.—Packing for screws.

point where the screw enters the side head frame. This packing is secured by a few turns of wire, the ends of the wire being twisted around a nut on the frame so that the packing cannot turn around with the screw. Thus the waste brushes off any dust from the screw before it can get to the internal thread where it would get wedged into a hard mass, greatly to the impediment of motion of the screw. By oiling the waste occasionally it can be made to serve as a lubricator. To oil the exposed part of the screw only helps dust to stick on, but the waste only oils such parts of the screw as it cleans off.

Rules and regulations can be adopted, safety devices can be attached to machines, guards can be erected and warning signs posted, but all are useless unless every man is careful to see that they are maintained; unless every man is careful to watch for danger; unless every man is careful to warn others of danger.

It is stated that there is a large amount of business in South America awaiting furniture manufacturers. Some of the large makers in the States are already sending men to this territory to work up new business, find out what styles are wanted and report the information so that the stock can be made up.

Oak seems to be in need of some exploitation and active pushing in the cabinet world, for gum, walnut, mahogany and imported woods have been crowding it out considerably.

Do not start a machine unless you operate the machine yourself, and only then when you are sure no one is in position to be injured by so doing.

The Waste Problem, and Remedial Measures Which Afford Its Solution

(Submitted in Canadian Woodworker Essay Competition, No. 2)

By Thos. Hogarth, Amherst, N. S.

THERE are many solutions to the waste problem and the remedy best suited to the particular line of business must be left to individual judgment. In some cases it is absolutely impossible to have no waste. Take a mill where the lumber is cut straight from the felled tree and has to be all edged up. One must make a considerable allowance for waste, for we cannot make trees grow straight or otherwise improve upon Nature in this respect.

As a rule this phase of the question concerns only large mills where there are various ways of taking care of wastage, there being many different ways of producing their cut of lumber, but in the case of a mill that buys its lumber in all manner of sizes and qualities for various kinds of work, the waste involved may amount to quite a formidable value. Take a case where a factory specializes in one thing. Often they experience considerable trouble in getting their stock delivered in the sizes required and consequently they have a large amount of waste ends and rippings. It may not be an easy thing to devise means of utilizing such material so as to lose nothing. Take a factory that turns out a number of different products, using all sizes of stock. Here it is a most important matter for them to consider how to reduce the wastage to a minimum.

Economy at the Cut-off Saw

In my opinion there is one place where a great deal can be done and that is at the cut-off saw where the material is first cut to dimensions. How many factories employ a capable man at this job? How many, are there not, who look at it in the light that anyone can use a cut-off saw and cut stocks to given lengths, whether he has brains or not? What do we find? What results do we get? We find that one man will make all manner of cuttings and waste and that another will waste less but use up a terrible amount of time in obtaining the better result. Under such conditions all kinds of cuttings and waste accumulate around the place. This is quite a common thing, and all because we do not cultivate facilities and ideas in this department. If, instead of putting on men of this unskilled type, we put on a man thoroughly familiar with the work, who knows exactly how to cut lumber so as to leave ends that can be turned into some other part of the job, the outcome will be entirely different. Such a man must be able to master the different stocks and requirements that are needed and develop his resources in such a manner that he will become really valuable to his firm. The position will soon prove to be an important one.

The objection may be raised that a firm cannot get a man to stay long enough, or that it does not pay to be always breaking in new men. Any objections of this kind are put into the background by paying men sufficiently. To do this is real economy for a firm, for a good man can save much unnecessary waste and put it into part of his stock orders.

How often in a mill does the charge man give this man full particulars of all the sizes to be cut out of the stock? Generally he gives him only so much at once, knowing that the man on that job is only a casual or cheap class of help and that if any blunders are made it will reflect upon him. He has to go slowly to avoid this. Now if a practical man is handling this work he can be given all sizes and requirements and will know exactly what to do with his waste if he familiarizes himself with what is following along all the time. Another point is that the charge man and sawyers would always have beside them, or in a conspicuous place, a board showing all sizes of stock for which waste is available.

At present I am on a cut-off saw. I am cutting out some seventy various sizes and shapes—some just out of the tree, never having been edged up. When I started I got the charge man to give me a full list of what he wanted. He asked me if I could scale all the lumber I cut up. This I am doing. It will run about 30,000 super. feet for this order when complete. My method of working is to cut out the lumber according to length, width and thickness and work down to the smaller lots, only handling the material once. I find now that I have not enough short stock and that I shall have to take long stock and cut it down after using up all my rippings and waste. What waste occurs is very small. Before I took on this work the firm just let anybody cut up stock and as a result they always had a large amount of short stock lying around. I know from experience that a man can use his head to good advantage on this particular work.

It seems to me that it would be an economical measure if lists were issued by the various firms showing the sizes of stock suitable for their requirements. They might be published in the Canadian Woodworker and placed within easy reach of the lumber dealers. It would enable the mills to form some idea of how to handle some of their cutting and so facilitate matters both for them and the consumers. Also there might be published a list of stock left over which might be handled by others. If such an interchange were more common it would greatly facilitate buying. Take a firm that buys all long and large lumber, which they must do for their particular line of business on account of the unsuitable character of the stock on the market. They have to buy the nearest they can, and this often causes much trouble which would be obviated if some scheme of co-operation were in force.

Another cause of trouble is the fluctuating price of lumber. This is one of the things that the buyer must watch, avoiding high prices so as to be able to compensate for any unnecessary second handling of the stock. I have worked in places where the waste has been burned to save coal. Sometimes this is all right, especially where coal is expensive and has to be hauled some distance. Again, I have known where waste has been stored and sold at so much a load, the revenue being applied towards a reduction of stock already bought.

There is no doubt that much unnecessary waste can be avoided by general co-operation and care in buying. Much trouble would be avoided by the list system as the mills could adjust both their cutting and

their prices. If the various woodworking industries combine to bring about improvement in this field they will do good not only for themselves but for the whole lumber business. Of course, my rules have applied particularly to the smaller firms that are not large enough to turn over any amount of stock and that are forced to give individual consideration to the waste problem.

Various Uses of the Sticker

By W. M. Lyons.

FOR years the possibilities of this machine have been discussed from almost every known angle, some writers treating on the present methods and some on its future possibilities. There are other machines, of course, with more delicate and complicated parts, but they are usually designed for one line of work. The sticker, when necessary, can do the work of several other machines, such as ripping, shaping, jointing, gaining, boring and tenoning. Should one endeavor to treat on all of the possibilities and uses of this machine, he would have quite a task to perform, so in this article I will give only a general outline of some of its practical uses, other than the sticking of molding.

Some time ago a writer made the statement that the sticker is practically where it was twenty or twenty-five years ago, but I doubt if he ever had much experience on any of the old-style stickers. If the sticker was no better to-day than it was twenty years ago, no one knows where the mill men would be.

As an illustration, suppose one should wish to manufacture a line of kitchen cabinets or some medium-priced furniture. Twenty years ago a man would need four or five more machines to turn out the work in a satisfactory manner than at present. Owing to numerous improvements on the sticker, one can now do with about 25 per cent. less machinery. Following is a list of the machines which form the equipment of a plant with a capacity of 100 kitchen cabinets per week: One swing cut-off saw, one self-feed rip saw, one tenon machine, one belt sander and one 12-in. sticker.

The sticker is used as a jointer, boring machine, shaper and gaining machine, in the following manner: The bottom head is used for facing off and jointing. For boring the end post for the caster shank, they use a chuck made to screw down on the outside side head mandrel, with a hole in the top end the size of shank on boring bit, the bit being held in place by a countersunk setscrew. For a fence for centering the post they use a piece of wood about 2-ft. long, with a gage or fence screwed on it. This guide is stood on end and clamped to the bed of machine in the correct position. A stop is also screwed on this fence the distance down from the end of boring bit that the hole is deep. The posts are held against this fence and pushed down onto the bit.

For gaining the ends for the shelves they have a wooden frame made, which is set down over the top head and clamped to bed of machine. The top on this frame is 14-in. wide and about 4-ft. long, and has a fence screwed on one edge to lay the stock to be gained against. On the back or bottom side there are two gains, 3/8 x 7/8-in., about 7 ins. apart. These two gains fit down on two pieces fastened to the wooden frame just mentioned, these slides being about 7/8 x 3-in., 30 ins. long.

In cutting the gains they use an expansion dado head, held in place with a setscrew, and by raising and lowering the bed of machine they can cut almost any depth of gain desired. They have a set of collars for the side head, the same as used on a regular shaper, and one would be astonished at the quality and quantity of work that can be accomplished in this manner. The sticker they have is a modern high-speed machine. Of course, all door stiles, rails, drawer fronts, end and back rails are grooved and rebated at one operation. All the end and back panels are purchased from a panel factory and are of the correct size. The only labor expended on them is in touching them up on the belt sander.

The sticker can also be used to good advantage in fluting columns. This is done by making a table about 8 ft. long and 12 ins. wide. Remove the pressurebar arm from over bottom head and the guide located behind inside side head. Then set the table down over the bed of machine, crosswise. On the edge of the table top next to head fasten a good straight piece about 7/8 x 2-in., 5 or 6 ft. long. This piece forms the guide for sliding the fluting device against. These devices are too numerous to take up here.

I should have stated that when one has to work some pattern of molding, part of which is straight and part on some given radii, should the radii be too small to work on the top head in the usual manner, the work can be done on the side head, using the same knives or combinations of knives, employing the same method, that would be used on the shaper.—Wood-Worker.

Furniture of the Gothic Period

In 1145, with the start of the Gothic era, were laid the real foundations of our present-day furniture industry. Influenced by the Orient and the Romans, and under the dominating calm of the religious symbolisms, our Gothic furniture craftsmen worked under as divergent methods as can be imagined. Confusion was never quite so rife among those who led the craft. At first, using odd forms for motifs, then rushing to decorative themes, then reverting to smooth, circular lines and finally ending with severe, regular, perpendicular constructions, arranged in geometrical form, these twelfth century furniture people were having a little internal warfare, all of their own.

During this period came the painting of the woods in flaring, flamboyant colors, and also came the use of wax, the bane of the industry for years. Clifford, in his admirable treatise, "Period Furnishings," takes occasion to dilate at length on the romantic side of the craft, during these primitive years.

Never except in this year of grace, nineteen fifteen, were the early manufacturers allowed such freedom of thought—such imagination and such scope of possible articles. Never, except now, was it in the power of the furniture manufacturer to dictate how homes were to look. Truly, the offices of a maker of furniture are only second to a maker of life—for after life comes the home, and the home is founded on furniture.—Furniture Industry.

Do not expect the helper to be as good a mechanic as the boss. He isn't, or he wouldn't be a helper. A little explanation as to the way the work is to be done may save an accident.

Stop the machine before oiling, wiping or repairing it, and don't try to operate a machine you do not understand.

The Sheraton Style in Furniture

By A. E. Hansen

THOMAS Sheraton was the last of the great English Century designers. The style of furniture attributed to his name, with its beautiful veneering and inlaid work, stands out as one of the finest examples of English cabinet-making and designing. The life story of Sheraton is a typical tragic story of erratic genius. Being born of parents who were desparately poor, he apprenticed to a cabinet-maker, picking up drawing and geometry in his spare hours. In about the year 1791 he arrived in London from Stockton-on-Tees, where he had been born forty years before, in 1751. He worked in London as a journeyman cabinet-maker until about three months after his arrival and then abandoned the bench for the pencil and pen. To make a living he wrote and illustrated books on the subject of furniture designing.

The imagination and passion for elegance of which his meager life deprived him blossomed into form and shape of beautiful and magnificent mahogany designs, inlaid with festoons of satinwood and polished to a mirror-like reflection to decorate the beautiful homes of the rich.

Sheraton himself lived his whole life as a poor man. He did not care to become rich, and in all probability would not have been able to have accomplished it had he tried to, as Adam Black, for a short time an assistant to Sheraton, says he lived in a poor street in London, his house half shop, half dwelling.

Sheraton did not use much carving on his designs; the decorative effect was mostly brought out by the use of marquetry and inlay, which characterized his style more than that of any other English style. During the Sheraton period veneered mahogany was chiefly used for the simpler pieces and satinwood for the more elaborate. Harewood and amboyna were also used and applied in veneers over cheaper and more easily worked woods. Shortly before the end of the century rosewood, necessarily mainly used in the form of veneers, also became increasingly popular.

While having a marked preference for tulipwood, kingwood and zebra wood for cross-bandings, with the grain running in the direction of its breadth, Sheraton employed all the woods which Heppelwhite used for inlays, and added mahogany and ebony. He cared but little for Circassian, as he considered that quite laid by since the introduction of mahogany; however, in modern Sheraton reproductions Circassian walnut veneers are probably used to a greater extent than those of any other cabinet wood.

Much has been said and written about the immorality of veneers as shams. Sheraton remarks that in most cases the core, veneers, glue and extra time are equivalent to the expense of solid woods, but in his day the thin veneers obtained by knife-cutting were unknown. Time has proved that veneers will last centuries, if properly laid, and yield contrasts by opposing, reversing or otherwise adapting successive pieces of veneer of practically identical pattern, which are virtually unobtainable in solid woods. Inlay work yields color results, and such alterations as age produces in the fine woods employed serve usually to enrich and blend the coloring, as can be seen by comparing new inlaid work, however skillful, with the delightfully mellowed and softened examples of old furniture.

The characteristics of the Sheraton style are its severe and simple, but beautiful, outline of designs; moldings were almost entirely discarded and carvings were used sparingly; in most cases the inlay and veneers were employed to bring out the decorative feature. Table and chair legs, whether round or square, were fluted or reeded and almost invariably tapered. Chair backs were delicately enriched with inlays, carvings or hand-painted panels. The seats were of cane or covered with printed silk. Of different kinds of chair backs were the stuffed back, which in common with the couches were usually adaptations from the Louis XVI. models; the "shield back," or, as it was originally called, the "camel back," undoubtedly from the rise of the back in the centre, resembling the outline of a camel back. Corner chairs were brought into use, square, tapered legs being used on same. Conversation chairs or two-backed chairs were adapted from the French "Voyense."

Sheraton was the originator of kidney-shaped writing tables. This is a delicate and beautiful table with stationary compartment, built with pigeon-holes and four small drawers for stamps, small papers, pencils, etc. These kidney-shaped tables are at times decorated with delicate painting or inlay. Of woods mostly used by Sheraton were satinwood, harewood, kingwood and rosewood. Satinwood is a very smooth, close and nicely-figured grain. The kind that was used in the Sheraton period was imported from East India; another variety grows in West India; but it is much coarser, plainer and more open-grained than the East India satinwood.

Harewood is originally sycamore, but, when stained, is called "silverwood" or "harewood." It is close textured and smooth, tough, compact and firm, but rather soft, and is therefore easy to work. Kingwood is imported from tropical America; it has a somewhat "soapy" but hard grain. On account of its small size it was usually used for lines or cross-banding laid "across the grain," with the grain running at right angles to the length of the line. Rosewood is a very even, but somewhat open, coarse grain, heavy and hard, and is mostly imported from West India. This wood was used by Sheraton only in lieu of mahogany. —Veneers.

The propellers of aeroplanes such as are used in the present European war may be made of selected ash, which is both strong and light and will not split under vibration or shock, or of built-up layers of spruce with mahogany centres. The framework of the machines, too, is generally made of wood, spruce being much used on account of its straight grain and freedom from hidden defects.

A surprisingly large number of substances, ranging all the way from the condensed fumes of smelters to the skimmed milk of creameries, have been tried or suggested as means of preserving wood from decay. Most of them, however, have been found to have little or no value for the purpose. Certain forms of coal-tar creosote and zinc chloride are the most widely used wood preservatives.

Since the outbreak of the war some very large orders for timber have been executed by the Province of Quebec, including an order for 4,000,000 ft. of timber, received from the British Government. A further government order for about the same quantity has been placed with this Province, whose lumber production in peace times has for some years averaged one thousand million feet per annum.

Up-to-date Designs in High-Grade Furniture

The designs illustrated on this page are Jacobean pieces which have found much favor with admirers of high-grade Canadian-made furniture. These designs, with many others, including the Adams style, are featured at the present time by the Chas. Rogers & Sons Company, Limited, Toronto. To mention a few of the characteristics of Jacobean furniture it may be remarked that there is no distinct line of demarcation between the late Elizabethan and the early Jacobean. The same style of ornamentation was used for some time, but a great deal of change took place—from the heavy and somewhat over-ornamented Elizabethan to severer forms and less ornamentation. Some of the latter work became quite plain,—rectangular, square, diamond and L-shaped moulded panels being much used. Turned legs and supports came in for a good deal of popularity and most of the carving was cut into the solid wood instead of the raised or applied kind. Inlaying was also used to a limited extent. Chairs with cane backs and seats were popular and of a much lighter design than the Elizabethan. The Jacobean was contemporaneous with the Flemish style, by which latter it was influenced considerably. It may be said that the Jacobean, Elizabethan and Flemish styles can be used together with perfectly harmonious effect in furnishing a room. The wood most in favor during the Jacobean period was oak. The main characteristics of Jacobean furniture are panelling, moulding, turned and spiral legs, flat or cut-in carving and a straight line of construction.

The pieces illustrated herewith consist of china cabinet, dining table (non-dividing pedestal), arm chair and diner, all of which are in quarter-cut oak.

Dining table in quarter-cut oak. Non-dividing pedestal, curtain on two leaves. Table extends to 10 ft. Top 54 ins.

Arm chair in quarter-cut oak.

Diner in quarter-cut oak.

China cabinet in quarter-cut oak. Top, 16 x 42 ins., height, 60 ins.

Attractive Designs in Period Furniture

The Storage of Lumber and Its Effect Upon the Grade

Specially contributed by Benj. A. Lake, Montreal.

GOOD lumber can be lowered in grade during storage much more easily than the grade of poor lumber can be raised at the same time. This will be pretty generally understood by anyone in a small mill who has had to assist in piling the lumber when shipped in, and who has later had to machine the same material. Therefore it would seem that we should be better off if we piled our lumber in such a way that the grade, whatever it might be, should not be altered at all in storage, rather than attempt to improve the grade of poor stuff while letting the better lumber take its own chances. Even at that it would be necessary to pay more attention to the lower grades, because lumber that is full of knots or that contains a lot of sap, is always taking the worst of any kind of weather that may come its way.

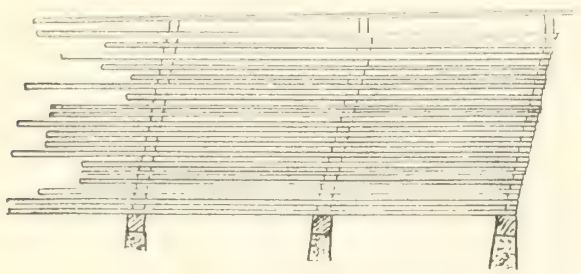


Fig. 1.—Pile for pine.

It is important in considering methods of piling to make sure that the cost of storage will not add more to the total cost than the difference between cost price of the wood and what it will be worth when removed from the pile.

For instance, to buy lumber at $25 per M. and spend $1.00 per M. in piling, without being able to get more than $25.50 for the lumber when sold, would soon eat up any profit that might be made in other directions. On the other hand, to buy $35.00 lumber and get it piled cheaply at 25c per M., and at the same time get the grade so reduced in the process that the wood is only worth $33 at selling, is even more expensive.

There is either loss or gain in the value of the lumber as it passes through the yard and factory, and to give any profit to the mill the gain in value must be greater than the cost of handling the material from car to customer. The proportion of loss or gain that may be attributed to the storage of the lumber varies greatly through the different branches of woodworking industries. The actual amount per M. of lumber, of course, does not show such a great difference, but the proportion to the total cost varies on account of the difference in actual manufacturing cost of various articles. Some manufacturers require a whole lot more machine and bench work to a given quantity of rough lumber than others, while the storage of the given quantity costs about the same. Therefore the less machine work required the greater is the effect of differences in storage cost on the total cost. Then there is the relation between storage and machining, by which the storage may govern not only the grade of the lumber as it stands, but also the machine cost when the wood goes into the factory.

For instance, crooked lumber has to be straightened and sometimes the operation of straightening will waste a whole lot of wood, besides taking extra time. Knotty and sappy lumber waste more in cutting and the cutter has to take more time in order to get out the best of the wood. All these things tally up quite a lot on the cost account, and there is always a chance that a poor piece of wood might get past into the finished work and lower its value although the manufacturing cost had been in excess of normal.

So that just how far the storage cost may be increased while still giving such results as will cause a greater decrease in the manufacturing cost is a matter that requires some thought on the part of the individual.

Covered yards and specially cut strips for all piles constitute part of the ideal storage system, but it is only the highest grades of furniture woods that would bear the cost of such an ideal. Still, lumber can be piled right even without going to such expense. The covered yard idea is derived from noticing the amount of time lost in uncovering a pile to get out a small quantity of material, and then again in re-covering it. Without putting up a permanent covering it should be possible to support the temporary roof of a pile so that stuff can be taken out without interfering with the covering. Piles that are to have large quantities taken out at a time can be covered right on top.

Whatever the roof is going to be, the foundation should be solid and level. To throw down some 4 in. x 4 in. or 6 in. x 6 in. right on the ground as a foundation is making a thoroughly bad start. The moisture from the ground will keep the lower tiers pliable and the weight of the pile on them will force them down to the unevenness of the bearers, so that when taken out the boards will have the appearance of having just come from a bending press, not to speak of sap stains and mould from dampness. None of the wood should be less than 12 in. from the surface of the ground. To make a real foundation the bearers should rest on short concrete piers, the bearers to be perfectly level lengthwise and holding up to a straight line across them with a fall to the rear of the pile of 24 in. in 20 ft.

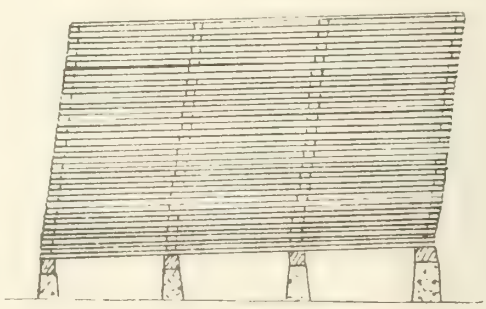


Fig. 2.—Pile for hardwood.

Ordinary pine lumber for planing mill work is best suited by three bearers on a spacing of 6 ft. (See Fig. 1). This allows for lengths from 12 ft. to 16 ft., the 10 ft. lengths being retained as crossers, thus helping out with the special strips. Some carloads contain enough 10 ft. stuff to strip the whole load when piled

in this manner. The front end of each tier is kept about ½ in. ahead of the tier below, and the front strip is placed right at the front end, which helps prevent checking. Wherever possible piles should lay east and west so that the maximum heat of the sun does not fall on the ends. With hardwood the style of piling is the same except that strips should not be more than 3 ft. apart and no ends should be allowed to project beyond the last cross strip. This is solely on account of the warping tendencies of hardwoods, and calls for a separate pile for each length, or at any rate for the separation of different lengths. A bunch of short lengths may be piled on top of a lot of longer

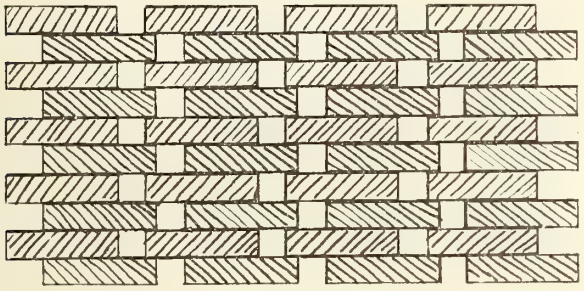


Fig. 3.—Pile tied without strips.

lengths provided that the crossing strips can follow in line one above the other (Fig. 2).

Of course a space is left between each board in the same tier so that air can travel upward as well as across the pile, and although it is usual when piling sized lumber to keep each board directly above the one beneath, it is the opinion of the writer that the upward drafts of air could be made to do more in drying the wood by breaking the joints.

By this means any upward current must impinge against the lower surface of a board in passing from one tier to the next, without being able to get straight up through the pile.

It is sometimes necessary to store lumber that is already dry, and in this case it may be piled close without strips except at intervals to tie the pile. A method that does away with the need for any crossers and at the same time provides a small air space throughout the pile to keep moisture from condensing in the lumber, is illustrated in Fig. 3. In one yard the writer saw 2 in. x 4 in. piled to a height of 20 ft. on a width of 8 ft. by this means. This should speak well for the strength of such a pile, although perhaps the fine sawing of the lumber (Swedish) had a lot to do with the stability of the stock. A 2 in. x 4 in. in this country seems to mean anything from 3½ in. to 4¼ in. wide and from 1¾ in. to 2¼ in. thick. There are not many people who would take that trouble with common 2 in. x 4 in. anyway, but this plan will work out well on 1 in. lumber and 2 in. stuff over 6 in. wide.

Even the "Safety First" aspect appears in connection with lumber piling. A shakey pile is more dangerous than an unguarded saw. Accidents cost money, and even if no one happens to get injured, the cost of repiling is a loss. Lumber does not gain anything by falling around the yard, either.

A late wrinkle in connection with wood split pulleys is to encase each side with a disc of veneer to reduce danger and also air currents. It ought also to effect some saving in power, by reducing the air resistance.

Difficulties of Foremanship

THERE are many foremen in furniture factories who experience considerable difficulty in maintaining discipline among the men, and probably more difficulty in maintaining a well-balanced system in connection with the work. There are exceptions, of course, but, as a rule, a great many of these so-called difficulties can be avoided by just a little foresight and common-sense thinking, writes Julius Bradley in the Wood-Worker.

It is very noticeable that the foreman who is everlastingly in trouble of this kind is the one who is rushing about and believes he is working hard; and he really is, but is not accomplishing much. The fact of the matter is he doesn't take time to think; the greater part of the work throughout his whole department is done by main strength and ignorance. The harder he works the more he finds to do and the more difficulty he experiences in keeping the work balanced. About the best thing for a foreman to do when he gets in a rut of this kind is to take a week's vacation, calmly and deliberately think the matter over

The answer he will give himself is about as follows: He doesn't appreciate the ability of his men; he is so rushed he fails in placing the men to good advantage; he is assuming responsibility that rightfully belongs to his men and is working himself into a nervous wreck, trying to do with his hands what he should do with his head in a quarter of the time and with only a fraction of the energy. The men under him gradually lose their confidence in him, and at this stage of the game he begins to experience difficulty in exercising his authority. Unless he calls a halt on himself, his days are numbered and the time not far distant when he will be classed as a failure, so far as a foremanship is concerned. It seems a pity to see men go into the discard who possess plenty of mechanical ability (and for this reason are selected as foremen) when all that stands between them and success is executive ability.

There are plenty of men who are successful as foremen, who themselves are not what one could call expert mechanics. Their success lies in their ability to develop and extract the desired skill and ingenuity from the men under them. After all, in these days of keen competition, the successful foreman, whether he is an expert mechanic or not, must expect to have his value determined by the production results in the department under his charge. In order to obtain a high value, every man in that department must be as near 100 percent efficient as it is possible to get him. I don't mean by this that the foreman must drive his men like slaves. On the contrary, he must educate them to accomplish the desired results in the most economical way and teach them that every motion beyond that which is absolutely necessary, is wasted energy.

There is still room for improvement in almost everything and the furniture factory is no exception to the rule. It is principally a matter of making it a study, particularly in processes where difficulties and imperfections are most conspicuous. If a foreman applies himself to providing and perfecting the means of doing the work, he will find little occasion to do very much of the actual work himself. He must consider himself in the position of master mechanic and apply himself accordingly. He will find, by so doing, that he will raise the mechanical standard of the men, the department results will be satisfactory and his own value will increase.

Cost Accounting In Woodworking Plants

A Practical System Which Enables the Manufacturer to Determine the Cost of His Product

By Jonas Howe

IN the December issue of the Canadian Woodworker the first of a series of articles dealing with Cost Accounting in Woodworking Plants appeared. The article which follows is a development of the subject, dealing mainly with that important commodity—Raw Material.

To find out "the exact" quantities and costs of lumber used in a factory, many methods of calculation have been proposed. A great many authorities have written articles and books upon this subject and it has even become a difficult matter to determine which of these methods is the best, or rather, the most suitable under particular conditions. It may be stated in the first place, however, that in the selection of a system of determining the cost of raw material in the form of lumber, the most important feature of any system to be adopted must be conciseness combined with accuracy. There is so much to be taken into consideration, such as allowance for waste, the cost of material wasted, and the proper range for various classes of work put upon the raw material such as previous handlings, dry kilning and culling, that it is unwise to lay down any specified rules for general use without providing a practical method for verifying them. The writer, like everyone else who has had experience with cost accounting, has come across a number of companies which make occasional "tests" in order to ascertain the cost on certain raw material after it has been cut up for distribution. Some of these companies are more conservative than others and check up their raw material with that which is actually purchased. They find then, as a result of their tests, that the quantities used do not balance with the quantities shown in the records of the purchasing department. These tests, in fact, are only a sort of guess-work, used to serve as a transitory guide for temporary purposes.

A cost system to be satisfactorily effective must be perpetual. For this reason all raw material (as well as labor) must be taken minutely into account. At the expiration of some definite period of time the results of this work, i.e., the quantities of raw material (lumber) used in the various jobs will no doubt show some difference when compared with the records in the purchasing department. At this stage of affairs the discontented investigator probably throws up his hands and sets himself down as a poor calculator. In reality he has secured the necessary data for the work which he set out to do, but does not know how to take advantage of this information. **These differences (balances) should be noted and carried forward to the next period of calculation and adjustments made accordingly.**

All lumber, when it is received in the yard, has a definite cost. Large quantities are frequently sold without entering the mill. For these, a very low rate may be fixed as an equivalent to the burden or expense which has been incurred in carrying them. Then there are quantities of lumber which enter the mill and are dressed to a greater or less extent. For these a higher rate must be fixed as an equivalent of the burden or increased expenses incurred in their connection. Then again, there are quantities of lumber which are cut up for detail mill work. The cutting-up department of a factory is continually stocked more or less with the lumber commonly used, and this is frequently culled and reassorted. It thus becomes necessary to provide a Lumber Record Card (form 5) on which the quantities and costs of all lumber received and charged to the factory are recorded on the debit side. The quantities and costs of all lumber cut out for jobs entered should tally with the card records, or with an outside company's invoice, after the material has been purchased specially. On the credit side the quantities and costs entered should tally with the quantities and costs on the Lumber Cutting Requisi-

1" # 1 K.D. Pine — WIDTHS

DATE	RECEIVED FROM	QUANTITY	VALUE RECEIVED RATE	VALUE RECEIVED AMOUNT	DATE	DELIVERED TO	QUANTITY	VALUE DELIVERED RATE	VALUE DELIVERED AMOUNT	FEET-B.M. ON HAND
May 2	on hand	320	42.00	13 44	May 2	F.O. 1433	21'	05.5	1 16	299
					"	1412	108'	"	5 94	191
					"	1437	14'	06	84	177
						1422	135'	05.5	7 43	42
May 3	Yard	400	42.00	16 80	May 3	1430	37'	05.5	2 03	405
					May 31					241

Form 5—Lumber Record Card.

CHARGE TO J. Brownlow F.O. No., 1429

ARTICLE, 1 Stand

No. PIECES	PART	LENGTH	WIDTH	THICKNESS	WOOD	FEET B.M.
1	Top	2'-2"	1-6	7/8	2. Oak	4
3	Shelves	1'-10"	1-2	5/8	"	8
4	Legs	3'-9"	1 3/8	1 3/8	"	3
						15

Form 6—Lumber Cutting Requisition.

tions (form 6). These forms are filled out by a layout man and used for the purpose of recording the material used in cutting out for a job. Copies of forms 5 and 6 are filed in numerical order by the cost clerk, who withdraws them whenever a job is completed. The costs shown upon these records are figured out, making reasonable allowances for waste. The quantities recorded on the cutting requisition

No. 17427

STORE KEEPER, PLEASE SUPPLY,

NAME J Brown

CLOCK No 207 LOC. No. 141

QUANTITY	ARTICLE	CHARGE TO.
1	Brass Catch	J01466
2 prs	Hinges	" "
24	Screws 3/4" #5	" "
16	F. Brass do 1 1/4" #10	" "

DELIVERED BY, A. Smith STORE KEEPER

FEB 25 1914 191.

POSTED. R.M. CARD G. L.

POSTED COST CARD G. D.

Form 7—Factory Requisition Slip.

cards are posted on the cost cards, together with their ratings for handling, etc., and also on the credit side of the Lumber Record Card. After a certain period, the Lumber Record Cards are balanced and the results will show whether it is necessary to make further adjustment in order to allow for waste or to make alterations in the ratings as they have been charged to the jobs, including the operating expenses of the cutting-out department.

Other raw material which is used directly in the various jobs and indirectly about the plant must be taken into consideration. This material consists of numerous items such as window pulleys, sash cord, hinges, locks, screws, handles, glue, sand paper, oil, files, etc. Every up-to-date factory has its store, where the raw material (excepting the rough lumber) is kept. Without such accommodation as a store in any large plant, there may usually be seen two or three workmen hunting about for some such material which they require. The result is a continual waste of time, to say nothing of a considerable waste of material. Under such conditions the men will help themselves usually to 50 or 100 per cent. more of material than is required, with a view to saving steps in going after more. Whatever is not used at the time is frequently allowed to lie around. Possibly it will be lost or carried off.

With a store and a clerk in charge every workman knows exactly where he must go whenever he requires raw material. A Factory Requisition Slip (form 7) is used in this connection, and is handed by the workman to the store clerk and the goods are delivered at once, thus eliminating this source of wasted time and material. The requisition is checked and transferred to the cost clerk who posts the raw material items on the cost cards. All mouldings and length stock which is required for certain classes of work may also be considered as store material and handled in a similar manner. Every line of raw material on hand is represented by a Record Card (form 8). With these record cards the quantities of material on hand must balance at the end of a period.

Forms 6 and 7 are finally transferred to the cost clerk who ascertains the quantities and costs of all the raw material used. The direct costs thus ascertained are charged to the various jobs going through and the indirect costs are charged to the department or location where the material is used.

In the third article of this series the subject discussed will be INDIRECT LABOR AND MATERIAL.

ARTICLE Screws Iron F.H. 1 1/4" #9 MAX. QUANTITY MIN. QUANTITY 1 gross R.M. No. 1132 SECTION F

DATE	RECEIVED FROM	QUANTITY	VALUE RECEIVED RATE	VALUE RECEIVED AMOUNT	DATE	DELIVERED TO	QUANTITY	VALUE DELIVERED RATE	VALUE DELIVERED AMOUNT	QUANTITY ON HAND
May 1	on hand	5 1/2 gro.	.24	1 22	May 4	J.O. 1828	1 gro.	.30	10	4 3/4 gro.

Form 8—Material Record Card.

The Position of Oak in Furniture

OAK has always held an important position in furniture manufacture. Go where you will, you will always discover furniture exhibiting the commendable qualities of this wood. It occupies an important place at the principal furniture shows, and the probability is that it will continue to win the favor of admirers of the ornate in furniture.

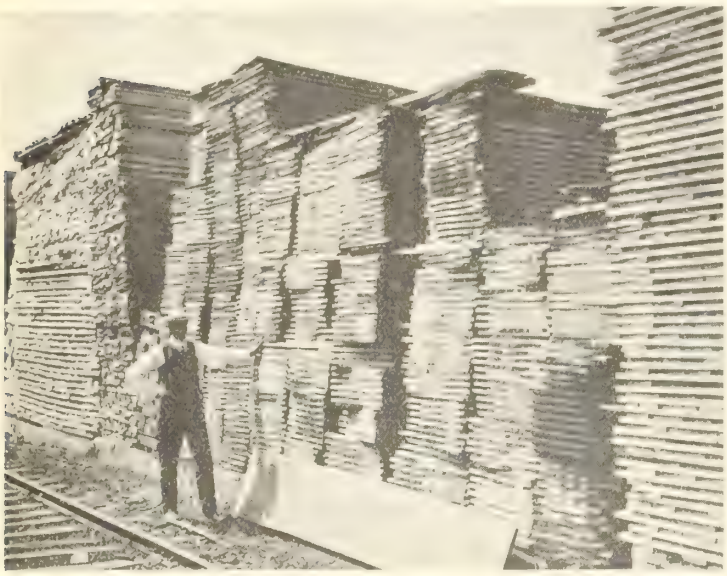
Persistent efforts at exploitation have really helped to popularize other woods in the cabinet world. This exploitation has taken on various forms, and in some instances oak has been overshadowed in the process. Few are disposed to deny that certain other woods are gradually coming into favor and capturing an important share of the trade hitherto monopolized by oak. We have many excellent native cabinet woods, and the list of attractive imported woods is increasing. This is only as it should be, in view of the necessity for variety in furniture as in other things. This does not mean, however, that oak should be relegated to a back seat. In short, we are of the opinion that this wood is really entitled to a more prominent and a more enduring place in the furniture industry.

The man without a cost sheet when the volume of business does not keep the factory running, is as badly off as the factory without a safety appliance to protect the men against accident.

Extensive Imports of High-Grade Mahoganies

BUSINESS relating to the handling of mahogany woods has taken on a new interest owing to the restriction in the import of the Queen of furniture woods from European ports since the outbreak of the war. At the present juncture it will be of interest to review some of the mahoganies imported into this country by prominent mahogany dealers in Canada.

The firm of Robert Bury & Company, Limited,



Carload of British West African Mahogany.

Liverpool, Eng., have a branch office at 79 Spadina Avenue, Toronto, the yard being located on the Bay front, a short distance east of Spadina Avenue. The connection of the firm with the Canadian trade is therefore of much interest. The firm deals extensively in Canadian and United States hardwoods and decided some time ago to embark on the mahogany importing business. Realizing the importance of the demand in Canada for high-grade mahogany the company have made a specialty of importing good stocks with attractive figures. The stock shown in Fig. 1 is a car load of exceptionally fine grade of British West African (Benin) mahogany, which was shipped by their head office at Liverpool. An examination of the pile itself showed that the hearts and poor ends of the logs were held back by the company in the Old Country. Owing to the excellent facilities at their disposal for handling the wood, they are enabled to dispose of the hearts and poor ends in England, sending to Canada only the high-grade stock. The result is that the Toronto stocks of the company contain only highly figured and richly colored wood. The poorer grades of mahogany retained in England are disposed of largely to manufacturers of cheap furniture.

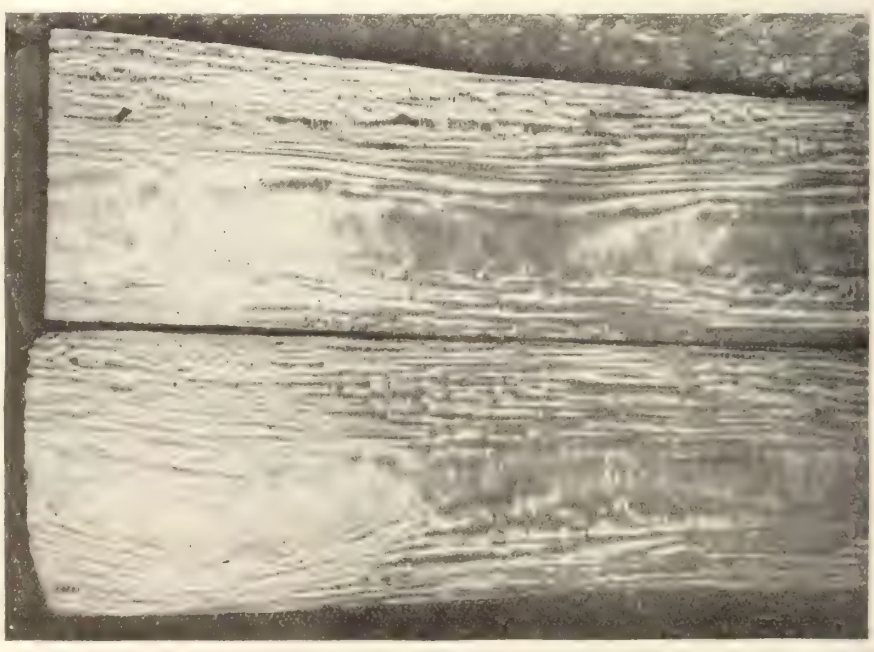
The Toronto office of Robert Bury & Company makes a specialty of supplying stocks for the piano, furniture and similar trades handling hardwoods. They continuously carry a fine grade of stocks in their yard at Toronto, always keeping on hand about half a million feet of maple, basswood, elm, etc., at country points. A specimen of figured mahogany handled by this firm is shown in Fig. 2. It is of the variety known as the Ocean Wave figure and is sold by them to the higher trade for manufacturing into high-class veneers.

Another Canadian firm which specializes in the manufacture and sale of hardwoods is the Wilson Lumber Company, Limited, Toronto, whose offices are at 1 Spadina Avenue. One of the principal lines handled by this company is South African mahogany. Most of this stock is highly figured wood and some of it is scented. Scented mahogany coming from Grand Bassan is not imported into Canada in very large quantities. A shipment from Liverpool some time ago, consisting of six car loads, about 36,500 feet, contained a large number of boards averaging 66 ft. and running to a length of 24 ft. In the preparation of mahogany lumber for shipments the logs are sawn and the product of each log is banded together so that the purchaser secures his stocks in convenient log form. Practically all the stock in this shipment was intended for conversion into furniture and showcases, a small portion being used for the interior trim of motor boats. As indicating the destination of an important part of the shipment it may be mentioned that a large quantity was immediately forwarded to the plant of Jones Bros., Dundas, Ont., manufacturers of high-grade interior fittings.

Both these firms handle and pile their mahogany stocks in a most careful manner. This is undoubtedly to the interest of the owners as careful treatment of the lumber improves the color of the stock.

Mill work and interior trim have quite an effect on the furniture trade. If oak is used for trim there is a natural turning to oak for furniture, whereas if mahogany is used for trim, in either office buildings or homes, there is a disposition to prefer mahogany also in the furniture.

We have arrived at the stage of progress in veneer work where no fine face veneer should be put on without good cross-banding underneath.



Mahogany known as the Ocean Wave figure

QUESTION BOX

A Practical Department of Reference for the Practical Man

Insufficient Draft From Fans

Q.—"I am a millwright employed by a lumber mill and have a problem that is too much for me. We have two fans of different sizes discharging into one separator. The draft has never been good from either of them, but we have managed until recently when it became necessary to shut one down for repairs. This fan was immediately flooded with dust and shavings from the other and the draft of the latter so much improved as to make us dissatisfied with the results we have been getting. The separator looks all right and so does the piping. I suppose they are not speeded right, although after changing pulleys to both increase and decrease the speed of each fan, I am no nearer the solution. Can you help me out?"

A.—Make a gauge like the one shown in Fig. 1. Punch little holes in the intakes and discharges of each fan about three feet from the machine, just large enough to be a tight fit for the rubber tube of the gauge. Note the pressure and draft of each fan running separately and you will find that one of them is producing more pressure than the other, and therefore "hogging" the pipe. Unless the discharge pipes are over one hundred feet long, a pressure of four inches is sufficient to clear the pipe, and you should speed each fan to produce about 4½ inches running alone. Then when running together, neither will overcome the other, and more uniform and better draft at the machine will result. If you find that the draft with the four inches pressure is not sufficient to clear the machine, increase the speeds in the same proportions

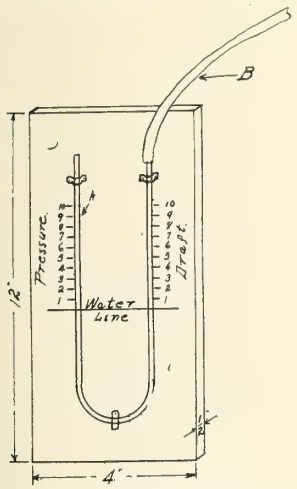


Fig. 1. (A)—¼" glass tube bent to form a U as shown. (B)—¼" rubber tube about 3 feet long. Scales marked on board are read as full inches.

by very small stages until you are satisfied, bearing in mind that there is an efficient speed at which the fan will run, above which it commences to take too much power. If you reach these speeds without getting sufficient draft, it will be better to install larger fans.

A Satisfactory Drill Jig

Q.—"In one of our processes of manufacture we have to drill a number of large holes in pieces of pine about 6 in. x 12 in. x 1 in., and as we cannot do this on a multiple spindle boring machine, we would like to bore five or six pieces at one setting. We have been prevented from doing this, however, by the chips getting between the boards and separating them sufficiently to cause a ragged cut when the bit cut through We would be indebted to you for a suggestion for a drill jig which will prevent this, without being cumbersome and take too much time to insert and remove the pieces."

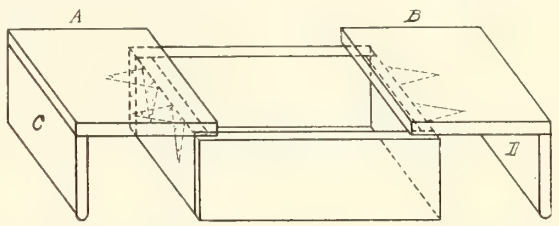


Fig. 2.—Make this jig of hard wood, deep enough to allow the top piece to be bored to set slightly above edge of box. Side clamps A and B fold under box when filling or emptying, and projections C and D should be just long enough to allow bottom of jig to clear the drill table by about 3-16", when full. Drill forces down box and holds pieces firmly during cut.

A.—The following sketch, No. 2, gives details of a jig which has been used with very good results in work of this kind, and not only prevents ragged edges on account of chips getting between the boards, but also prevents the pieces from moving and therefore reduces the chances of splitting. It can be loaded and empties very rapidly, and the use of compressed air to clear away the chips at the end of each cut materially reduces the time.

Maximum Load Transmission

Q.—"In making some changes in the location of machinery it is necessary for us to replace an old shaft with a new one, and we would be pleased to have your advice regarding the size of the shaft and width of belt necessary. We have to transmit a maximum load of 85 h.p. through a shaft 30 ft. long, the shaft speed being 300 r.p.m., and the drive pulley 48-in. diameter. Of course, we want to make a safe job of it, with the smallest possible investment."

A.—To transmit safely 85 h.p. at 300 r.p.m., you should install a 2 15/16 in. shaft. This would be too small for a long length, but for 30 ft., assuming that the driving and driven pulleys are at opposite ends of the shaft, it will be sufficient. A 48-in. pulley running at 300 r.p.m. gives a rim speed and therefore a belt speed of about 3,700 feet per minute, and the belt would need to be a 12-in. double leather or its equivalent. You will get the best results by mounting this shaft in roller bearings, and same should be lined very carefully, as 300 r.p.m. is considered fast for this size of shaft.

Relative Humidity

Q.—"What is meant by the term "Relative Humidity," and what relation has it to the condition of lumber in a dry kiln. Also how can one determine the percentage of moisture in lumber?"

A.—Relative Humidity is a term used to designate the amount of moisture actually in the air as com-

pared with what the air could contain without condensation at the temperature in question. Air is capable of holding more water when warm than when cold, therefore the relative humidity changes with the temperature, and air which would be damp at a low temperature would be considerably drier at a higher temperature without any change in the actual amount of water present. For measuring the relative humidity a hygrometer or wet and dry bulb thermometer is used. It consists of two thermometers reading exactly the same under ordinary conditions, one of which is kept wet by a wick dipping in a small bottle of water. The water crawls up the wick by capillary attraction, and evaporates from the bulb of the thermometer at a certain rate, depending upon the amount of moisture in the atmosphere. If it evaporates fast, it makes the wet bulb colder than the dry bulb, which indicates the temperature of the room, and the difference between the two readings followed out on a chart which accompanies each instrument gives the relative humidity of the air, as well as the weight of the water in the air, and the dew point. In the drying of lumber, the amount of moisture in the air and in the lumber gets to be about the same, therefore the condition of air as indicated by the hygrometer may be taken as approximately the condition of the lumber. If the reading indicates a relative humidity of 75 per cent., the lumber is wet, while on the other hand, if the reading indicates 10 per cent. or 15 per cent. it is dry, or will readily dry out under its own heat in the free air. Free air has a humidity that will average about 40 per cent., therefore lumber taken from a kiln in a dryer state reabsorbs moisture from the air until it reaches the same condition, which constitutes a tempering process, without which it is unsafe to use the stock. To determine the percentage of moisture in lumber, it should be weighed, dried bone dry, then weighed again, the loss of weight divided by the original weight giving the percentage of water.

Power Required for Band Saw

Q.—"What amount of power is required to drive a six-inch band saw, operating at about one hundred feet per minute, through four to nine-inch spruce?" Also what type of motor would you recommend, and how should it be connected to the saw for the best results? Our power is 500-volts, 60-cycles, 3-phase."

A.—The actual power required to drive the saw under these conditions is usually about 20 h.p., but the difficulty in applying motor drive to machines of this kind comes in the starting and bringing up to speed. This has more to do with the selection of the motor than anything else. The motor may be belted to a counter-shaft and tight and loose pulleys. This will enable you to bring the motor up to speed before applying the load by shifting the belt. Connected in this way you can do with the minimum capacity in the motor and the smallest investment, as a 25 h.p. 1,500 r.p.m. squirrel cage motor is amply sufficient. The same result can be obtained by belting direct from the motor to the machine with a slack belt and tightener, which will also enable the motor to start free and pick up its load gradually. If, on the other hand, you desire to connect the motor direct to the shaft, you will have to use a larger and more expensive motor on account of the slower speed required. If you desire to run the machine continuously with this arrangement and desire the maximum economy in current consumption, you will have to get a 25 h.p. 600 r.p.m. slip-ring motor which is more complicated and expensive than the squirrel cage type, but will start under the full load. If you do not intend to man the machine continuously and do not mind if you consume more power than is actually necessary, you can get a 50 h.p. squirrel cage motor, 600 r.p.m., and connect it direct. This motor will be large enough to start under full load, but is too big for the job of running the saw and will not operate as efficiently as a motor of the proper size. It should be remembered that slip-ring motors have exposed contacts or commutators from which sparks may fly, and sparks from anywhere are dangerous in the woodworking business. Slip-ring motors, if kept free from oil and dust, are safe enough. We mention this point only in order that you may be fully informed.

A Home-Made Glue Pot

Q.—"Can you refer me to anyone who can give me instructions for making an electrically heated glue pot for bench use, one that I can make myself?"

A.—Sketch No. 3 shows such a glue pot which will give satisfaction and is the only one the writer could recommend for a home made affair. It is really very difficult to properly adjust the heating element so as to be economical and safe, and the substitution of the flatiron heater element removes this difficulty. You will have to be careful to keep the element covered with water all the time, otherwise the solder holding same into the pot will melt—not a serious, but an annoying thing when you are busy. It will be impossible to damage the heater in this way, as it is designed to operate at a high temperature.

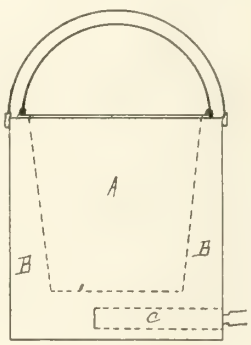


Fig. 3. (A)— Regular copper bench pot. (B) —Copper water jacket. (C) — No. 2 B, General Electric flat iron element, soldered into (B), leaving porcelain plate and terminals projecting.

Utility of Air Compressor

Q.—"We have been approached by some people who wish us to purchase an air compressor and pipe our mill for its use. Being half convinced but still in doubt, we write to see if any of your subscribers have similar installations and if so what their experience has been with them, and if they consider them a good investment?"

A.—We have sent you confidentially the names of some manufacturers whom we know are using compressed air to very good advantage. You will find, if you will take the trouble to investigate, that the air is used for a multiplicity of purposes such as operating hoists serving machines, loading and unloading lumber, cleaning dust from machines and walls and ceilings, pulleys, shafting, etc., cleaning motors (where it is indispensable) blowing chips from boring machines, and as a source of power for any work where a light, portable and powerful rig is required. We are positive that you will never regret the addition of an air system to your plant. Generally in a woodworking plant, where power comes cheap, the steam-driven compressor is preferable, but if you have to buy power, an electric machine is best and cheapest.

The Hardwood Market

THE opening of the new year has had the effect of ushering in a season of renewed vigor for the hardwood market. Although 1915 is not many days old, still the change which has come over the market during this brief period is quite remarkable, and is certainly an augury of better times ahead. During November and December hardwood dealers who are accustomed to handle large shipments of lumber were obliged to report the discouraging fact that business with hardwood consumers was practically at a standstill. This tone, however, has changed and it is pleasing to record that business is once more on the up-grade, the expectation being fairly well founded that before many weeks have passed the wholesale trade will have emerged definitely from its comparative impassivity and taken on, as it were, a new lease of life. The secret of this revival in business so early in the new year may be due in part to the long-standing practice on the part of many hardwood men to postpone their buying until the new year. It is well known that hand-to-mouth buying has been the order for months past, with the result that stocks have been accumulating to an unusual extent. Another reason for hoping that a general improvement will take place is the recognized fact that the furniture exhibitions which are held throughout the country at the present period of the year invariably result in a decided impetus being given to the hardwood business. Added to this is the general disposition to curtail logging operations. The inadequacy of the supply which is likely to ensue is a result which cannot fail to have an important levelling-up effect upon the market generally. All through the period of depression we have had the experience of prices remaining firm. From this it may be concluded that the financial status of the average manufacturer is by no means unsatisfactory. Of the various hardwoods mahogany is reported at the present moment to be very plentiful, with prices rather below the normal. In sawed veneers and built-up panels there is little activity, owing to the depression in sash and door as well as interior finish plants. It is not too much to hope that conditions in the hardwood market will be improved to an important degree in the next few weeks. One of the best indications of improvement is the strengthening of prices. This is true in regard to plain white oak and quarter oak. Poplar has also shown real improvement during the past few weeks. Reports coming from various parts of the continent are unanimous in predicting that before many weeks have passed a satisfactory change will have taken place in the hardwood field. Discussing this phase of the situation the American Lumberman says:

"While hardwood manufacturers are not particularly enthusiastic over the situation, business is starting the new year under more promising conditions. The industries are taking lumber steadily and a good deal of interest is shown in stocks for the future. The large users are beginning to realize that hardwoods are cheaper now than they will be later and are endeavoring to get under cover by placing contracts for their coming year's requirements. Quartered white oak is becoming scarce and quotations have been advanced slightly. Plain white oak is moving fairly well; red oak is a little slower. Poplar is showing some improvement and good sound wormy chestnut is in general request. Gum is still slow."

Southern Hardwood and Veneer Market

Written for the Canadian Woodworker

Louisville, Ky., January 10.—This is the season of the year when the subject of contracts is apropos. A good many important lumber buyers are handling their lumber purchases on this basis, and if the consumer can get a responsible hardwood concern to contract for the delivery of the stock he needs during 1915 at current prices, he is in an enviable position. The fact that prices are almost certain to advance materially during 1915 appears to have been realized by many important manufacturing consumers, who have made a special effort to place contracts, and thus cover themselves for this year, before the expected bull movement begins. In fact, it was stated by a prominent furniture authority that in one of the leading markets in the United States, which is not very far from Canada, contracts were placed in one week for over a million feet of lumber.

The contract, as such, does not appear to have the standing and the stability in the lumber and lumber-consuming trades as it has in other lines. It too often happens that the consumer who makes a contract, and who finds later that he can buy in the open market for less, due to a decline, fails to carry out his agreement, and declines to take any more lumber from the contractor, thus forcing the latter to lose the advantage which should have accrued to him. On the other hand, there have been cases of lumber dealers not sufficiently scrupulous, who, when the market went up, enabling them to dispose of their stock more profitably than to houses with which they had contracts, decided to do so rather than meet the obligations which they had incurred. If there are enough of consumers and enough lumber dealers of this kind to make the contract worth little more than the paper on which it is written, it is evidently time for a new set of ethics to be introduced into the business.

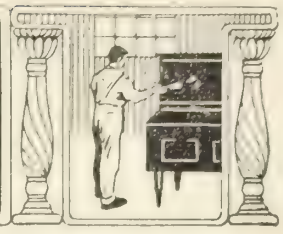
Aside from this proposition, however, the contract business is now up. Some hardwood men say that they will not make any contracts for lumber to be delivered later on at present prices. Doubtless there are others who will make such agreements, as evidenced by the fact that contracts are actually being made. It is probable that the average consumer would not contract unless he could do so at the present favorable prices, so that the completion of such agreements means the purchase of lumber for future delivery on a basis which ought to be very satisfactory to the user. Certainly it is not cenceivable that he will lose under such an arrangement.

In cases where contracts have not been made, but where the buyer feels that prices are too low to be "passed up," some big orders for immediate delivery are being placed. In one case a concern which concluded that it could do no better than invest in red gum for 1915 on the basis of present quotations bought enough to run it for most of the year, ordering immediate delivery. It had to do considerable draying and re-handling to get sufficient piling space; and evidently it must have figured a pretty good investment value in the stock to have justified taking such a large block.

Undoubtedly conditions are right for aggressive action of this sort. Already, the bull movement has begun. White oak, plain-sawed, is beginning to pull

(Continued on p. 33)

THE FINISHING ROOM



Formulas for Securing Good Staining Results

By A. Ashmun Kelly in Veneers

IF you will shellac mahogany before filling and staining, you will get a much more uniform result in the finish. The surface will then be without cloudiness. To give a yellow cast to walnut, making it a golden hue, and to enliven the general tone of the wood, apply picric acid.

Water stain is usually applied with a brush, but you will find a sponge much better than the brush. Water stain should be wiped off as soon as possible after being applied, in order to lessen its effect on the fibre of the wood.

For staining cherry add a trifle of rose pink and black to modify the red of the sienna. To secure an old cherry effect redden some shellac with dragon's blood and apply after the staining is dry.

For an oil stain to imitate mahogany, take burnt sienna ground in oil and tint with rose lake to the desired depth of color; mix with row oil and a little drier.

Varnish stain is made from varnish tinted with an aniline. If a short oil varnish is used, then add a little gum elemi, to give elasticity to the varnish; be careful to not add too much, for that would cause the stain to be sticky, according to the excess elemi used.

Potash will stain oak a deeper color than ammonia will, both these alkalies darkening the wood by a sort of burning. Potash will give oak a very deep red tone, even approaching black, according to its strength. After applying ammonia to birch or cherry, to impart a reddish tone, apply potash solution after the ammonia, which will deepen the red.

To produce a red effect on oak use a strong Venetian red in oil, adding a very little drop black to tone down the red.

All pigments used in staining should be of the best grade and ground to the utmost degree of fineness, making it what the color grinders call butter fine.

In staining oak with oil stain, let the stain set, then wipe off with a cloth, to bring out the high lights.

Equal parts of japan gold size and the best (Assyrian) asphaltum varnish, thinned out with turpentine, will make the best possible golden oak stain; it dries quickly and hard, and will not raise the grain of the wood. Apply it liberally, but wipe off clean. This will fill the pores of the wood, but will leave the flakes the desired golden hue. The wood may then be filled with a mixture of burnt umber and drop black, or the equivalent, Vandyke brown.

The application of a solution of 50 parts of commercial alizarine in 1,000 parts of water, to which ammonia is added until perceptible to the smell, will give a fine red-brown color to maple and yellow-brown to oak and firwood. After applying the solution brush the surface over with a 2 per cent. solution of chloride of barium, when the maple will take a dark-brown tint and the oak a brown hue of less intensity. If, instead of the barium, a 2 per cent. solution of magnesia sulphate be used, a dark violet brown will be obtained on the maple and a dark brown on the oak and the fir. Alum and magnesia sulphate will impart a vivid red to the maple and a blood red to the oak and fir. Chrome and alum will give to maple and fir a reddish brown and to oak a fine Havana brown.

Hot water stain should always be used when staining hardwoods with water stain; it penetrates the wood better than cold stain will. In general, water stains should be warm, rather than cold, and if the surface to be stained is warm also, so much the better. Soft water should always be used for stain, and limestone hard water is not at all desirable. Softwood will take cold stains well enough, but not so the hardwoods.

The color of a stain may be lightened in two ways: it may be diluted with water or be well rubbed off after application. The latter is best where possible, as it gives plenty of pigment, while the diluted stain is weakened.

Water stain is best for such a wood as birch, for an oil stain will sadden such woods, whereas water stain will enliven the wood and bring out all its natural beauty. Water stain should be well rubbed into the wood and then be rubbed off quickly. On softwood, however, the stain does not require rubbing in. A thin coat of shellac will hold stain, after which any desired finish may be given.

Wood Putties.—By mixing some sawdust of the wood that is to be puttied with glue size and coloring, a filler for nail holes, etc., may be made that will defy detection, if skillfully used. This is the common cement or putty used for the purpose, but there are others.

A very hard cement may be made by melting an ounce of brown rosin and an ounce of beeswax in an iron pan, and, when the two substances are perfectly melted, add any desired coloring, say Venetian red, yellow ochre, and so on. This cement must be used while hot, for it will become hard as stone upon cooling and will adhere perfectly to the wood.

A sawdust cement may be made by dissolving 1 oz. of the best cabinet glue in 16 ozs. of water—hot, of course—and when the glue has dissolved and the size has been allowed to get cold, stir in some sawdust of the right kind (that of the wood that is to be filled, or coloring may be added), then add some whiting, to form a putty. This makes a very satisfactory cement.

A cement may be made of fresh dry slaked lime one part, rye flour two parts, with enough raw linseed oil to form a putty; varnish may be used instead of the oil, making the cement tougher. Add any desired coloring.

Still another cement: Add together equal parts of red lead, white lead, litharge and pulverized chalk, all dry, and mix into a putty with raw linseed oil and a little varnish.

Cabinetmaker's stopping is made as follows: Place a tablespoonful of gum shellac, a teaspoonful of pulverized rosin and a bit of beeswax the size of a hulled walnut all into a cup or small iron pot, and place on fire to melt; then it may be used like sealing wax. Any desired coloring may be added to match the wood it is to be used on. The stick form, when wanted for use, may be softened by holding in the blaze of a can-

dle and allowing the melted portion to run into the crack or crevice it is desired to fill. The filling may be levelled off with a chisel or painter's putty knife.

On hardwood finish, when it is desired to stop nail or other holes, etc., it is better to do it after one or two coats of shellac or othe rcoating have been applied. The idea is to allow the shellac or other coating to bring out the color of the wood as it will appear in the finish, when you can match that color with your cement. If anything, the putty or cement should be a trifle darker than the wood, for the wood will become slightly darker in time, and then the putty will be just right.

Whiting putty for hardwood finish should be made from dry white lead, not whiting, for the lead gives clearer color where the cement is to be colored, besides which the white lead putty, especially if a little varnish is added, will not shrink as whiting putty will. Some, however, advise the use of a little whiting, too, though I do not know why. A good formula for such a putty would be as follows: Dry white lead, three-fourths and best gilder's whiting, one-fourth, all mixed to a stiff paste with boiled linseed oil, or raw oil and a little rubbing varnish.

Filling Wood.—A filler should be made to suit the particular needs of the wood that is to be filled. If the filler is too heavy, the work will show it and you won't get a good result. Fill the wood pores full and a little over. Sandpaper will remove any surplus.

It is always best to weigh quantities when making or thinning fillers. This will insure your getting just the right quantity of each ingredient in the composition.

For general purposes a filler made by thinning up 12 to 14 lbs. of paste filler with 1 gal. of turpentine may, of course, be altered to suit any particular case. Two thin coats of filler, applied after a twelve-hour interval, are better than one heavy coat, although in the latter you may get on just as much material, the surface will be rougher, though. By making the surface smooth at the beginning your work will be very much lessened all the way through to the finish.

The Adaptability of Birch to Various Kinds of Finish

By R. S. Kellogg in The Furniture Manufacturer and Artisan

BIRCH is one of the most widely useful woods. A recent tabulation of factory reports shows that birch is used for nearly 200 distinct purposes, ranging from automobiles to zither bodies, and covering such diverse articles as barber chairs, billiard tables, wagon bottoms, cheese boxes, butter moulds, electrotype bases, wagon hubs, piano cases, refrigerators, shoe pegs, spools, farm implements and interior finish.

More than half of the total output of birch is used in the manufacture of furniture and fixtures, and for mill work. The latter includes all kinds of interior finish, veneered doors and high-grade flooring. In fact, it is in the field of interior finish that birch finds its highest and most appropriate use. Employed originally as a substitute for mahogany, birch is now appreciated for many sterling qualities of its own, some of which are not possessed by mahogany.

There are as many styles of birch trim as there are designers who wish to produce an unusual or particularly appropriate effect. In my office, I have 24 kinds of birch moulding, casing and base, that are only a few examples along this line, while in the field of grille and stair work, the variety is even greater. My own preference is for the simpler styles which offer the fewest possible angles and corners to collect dust and at the same time give the largest uninterrupted surface to display the figure and sheen of the wood itself. For the same reason, my choice is for the softer hued stains which bring out the qualities of the wood in harmonious fashion, rather than for more brilliant colors, or paints which completely obscure the natural beauty of the wood. We paint iron and brick for protective reasons as well as to give a more pleasing effect. When we work with wood, it should be our purpose to enhance and not obscure its characteristics of figure, color and grain.

The perfecting of veneering processes, and especially of rotary cut veneer, enables us to get at a reasonable price, a combination of large sizes and beautiful figures in panels that would be altogether impossible were we restricted to solid lumber. Moreover, the well-built-up panel is stronger and much less likely to warp or check than is a solid piece of wood of the same or even much greater thickness. Veneered panels may be obtained in almost any size desired, and where appropriate, they provide a wonderfully effective means of interior finishing.

Recent years have seen a great advance in the manufacture of artistic doors which are at the same time simple in design and reasonable in price. Here, again, progress has been made by the use of veneer. There are many styles of doors to choose from. One of the most pleasing to me is a single panel birch door stained silver gray, but other styles have many admirers.

Among the most useful developments of modern lumber manufacturing is the production of high-grade hardwood flooring. This flooring is manufactured to exact sizes from selected, thoroughly seasoned stock, and is as carefully handled as is interior finish. In fact, a beautiful and durable hardwood floor is an important part of the inside of a building, now that carpets have been replaced by rugs.

Hardwood flooring is made from kiln-dried stock, is stored in dry sheds and shipped in closed cars to prevent the absorption of moisture and the user should see that it is carefully handled, correctly laid, and properly finished. Some of the points to bear in mind are to avoid unloading the flooring in damp weather; not to store it in open sheds or in newly plastered buildings; nor to lay it until the building is thoroughly dried out. When the under-floor is used, as is advisable with the thinner sizes, the flooring should be laid diagonally across the sub-floor, and the latter should be dressed to even thickness. The best practice indicates the use of steel cut nails for hardwood flooring. The nails are manufactured especially for this purpose and should be driven at an angle of 45 degrees.

Wherever a particularly rich effect is desired to harmonize with finish and furnishing, nothing is superior to a selected red birch floor. It is as strong as maple, sufficiently hard to stand service, and of unusual beauty of figure and color. Such a floor finish-

ed natural is not out of place in the most palatial structure.

The demand for conveniences and economy of space has resulted in a wide variety of built-in work, all the ways from kitchen to bed-room. Built-in bookcases, china closets, sideboards and wardrobes are considered among the necessities of the modern residence. For them no wood is superior to birch. In addition to its desirable qualities of figure and color, birch looks well and fulfills every requirement of high-grade cabinet wood. We have all seen beautiful examples of built-in work that harmanize perfectly with finish and furniture, which are also the ultimate of convenience and utility. Large quantities of birch have for many years gone into furniture factories to emerge as mahogany. The only fault we have to find with this is that birch has not received the popualr approval it would if the furniture had been generally known to be birch. Perhaps we are getting to the time when we consider it more important to purchase useful democratic material under whatever name it comes than to have an imitation of an aristocrat. At least, I hope so, for birch has the qualities required of the best furniture woods. More birch is used for parlor furniture frames than is any other wood. Every argument in favor of birch for interior finish applies equally well to birch for furniture, and there is added one of harmony between finish and furnishing.

Importance of Good Stains

Reliable stains of nearly any shade desired may be purchased in shape for applying. Samples and color schemes are freely supplied by the manufacturers. Care should be exercised, however, to make sure that the stains selected are of tested quality. Care should also be exercised to have the wood thoroughly seasoned, surfaced and cleaned before applying the stain. Since birch is a close-grained wood, a paste filler is not necessary. Birch is just the right density and texture to form a superior base for white enamel, and it is largely used for this purpose.

Stains are designated as spirits, oil, or water stains, according as the medium in which the color is held in solution is alcohol, oil or acid. Spirit stains are not recommended for birch since the alcohol evaporates so rapidly that it is difficult to apply uniformly. Oil stains give splendid effects, but not as clear and transparent colors as are produced with water stains. Water or acid stains are evenly and quickly applied and permit any method of finishing over them. The objection that water stains sometimes raise the grain of the wood is averted by sponging the wood with clear water and sanding it smooth before applying the stain.

Varnish magnifies the natural appearance of the wood, hence defects, as well as natural beauty, are also magnified. This makes it especially important to have the surface smooth and free from defect, dirt and dust before the varnish is put on. Varnish works best at a temperature of about 70 degrees and in a dry atmosphere.

Rubbed, or rubbed and polished finishes give the best results with birch. I recently saw an excellent silver gray produced on birch by one coat of acid stain followed by sandpapering, finished with one coat each of white shellac and wax and then rubbed. There are also some flat finishes that are satisfactory for certain purposes. The user of birch should always remember, however, that he is handling a high-class hardwood whose peculiar richness of tone and figure is worthy of his most painstaking efforts.

Detailed direction for the staining and waxing of birch woodwork and floors will be supplied if desired, and while we have no special interest in promoting the sale of any particular brand, we are always ready to give the names of firms whose products are of proven reliability on birch.

Where to Use Birch

Having thus outlined the qualities of birch, the next is: Where shall we use it? My natural inclination is to reply: Everywhere in the interior of your building. It is of proven worth for such hard service as store counters, show cases and fixtures, while its merits make it just as appropriate for trim of the finest of residences, apartments, offices and hotels. Moreover, the reasonable cost of birch places it easily within the reach of the builder of the modest cottage or bungalow. The Colonial hall and stairway in white enamel, the living-room in silver gray, the dining-room in one of the many shades of brown, the bed-room in white enamel or natural, the den to suit the owner's particular fancy—all offer suitable opportunities for the use of birch. Among the stains which I like best on birch are silver gray, walnut, fumed oak, natural and Mission brown. These are colors which harmonize well with general schemes of decoration, and are not likely to get on anybody's nerves. However, I have no quarrel with the user of birch who prefers an entirely different selection. The wood will take and hold permanently any stain of the right kind that is properly applied. So good an authority as Keith says that "Birch is the ideal high light for a scheme of coloring in browns with notes of blue and orange;" also that silver gray is beautiful in a room with walls of dull old blue, and a ceiling of silver gray on which are frescoed pink old roses, but not being a professional decorator, I shall have to go carefully here.

One of the best features of birch is that it combines so well with other woods. I have seen excellent combinations of maple or oak floors with birch trim, and of birch veneered doors with a trim of other woods or white enamel. Your own observation will furnish a multitude of instances of this sort.

The Manufacture of Trucks

AN important use for hardwoods is found in the manufacture of hand-power business trucks. "The making of articles of that class has grown in importance until it has almost reached the dignity of an industry," writes Hardwood Record. Apparently there are no statistics available showing how many trucks are made annually, or the quantity and kinds of wood entering into their construction, but in practically all trucks of that class some wood is used, and many of them are built largely of wood. In the majority of cases the hardwoods, such as beech, birch, maple, oak and hickory, are employed. The common two-wheel truck used by railroads and warehouses is one of the best known. It picks up and carries boxes and other heavy articles and is made in many styles. There are usually four sizes. Box trucks are wholly different from those which pick up their loads. They handle heavy cases and consist of strong wooden frames, rectangular and triangular, depending on the pattern. The load must be lifted and placed on the truck and is then trundled to its destination. These vehicles have no handles.

(Continued from p. 29)

away from red, and in some instances a difference of $2.00 to $3.00 a thousand has been noted. This is due to the fact that a smaller proportion of red oak than heretofore has been quarter-sawed, on account of the low price of quartered red oak, so that the proportion of plain red oak to the total production of plain oak is unusually large. That has had the effect of putting a premium on white oak, and the price has been stiffening right along. Quartered oak is in improved demand, and some good sales at rising prices have been reported by leading manufacturers. All along the line the report is coming that inquiries are heavier, and that furniture manufacturers and other consumers are operating sufficiently to keep a good deal of stock moving.

One point of interest to the consumer, in relation to the general question of supply and demand, which controls more definitely in the lumber business than in any other line, probably, is the extent of the production. As a matter of fact, the output is less now than it has been at any time since the movement to curtail, as the result of the war and its accompanying conditions, began. In the Memphis district, for example, it is reported that less than half-a-dozen mills are running out of a total of nearly fifty. There are some big operations still going on, but these are not so numerous but what they can be counted very readily. The biggest operator in this section recently closed down five mills which he controls, resulting in a decrease of production of close to 100,000 feet a day, With this reduction in the output in evidence, and lumber moving steadily, if not at a normal rate, to the consumer, there is only one answer, and that is, that supply and demand are getting close enough together to bring about normal prices. This reasoning has been used by many large buyers as a basis for getting in all the stock they can handle at the present prices.

Poplar is another item which is rather good at present. The demand is improving, and prices are also moving up. Poplar is the best wood of its kind, and though it has been hammered at by other varieties from time to time, it has been holding its own in many lines of work, and for all purposes where gluing-up is to be done, it is still the favorite. Poplar prices are now on a level, which makes it as good a buy as any sort that could be named. This condition is being taken advantage of by those who have a leaning for it.

The railroads are beginning to buy more freely as the result of the rate advances in the North and East. If the advances proposed in the South, which are now being fought by the lumbermen of that section, go through, the consumer in Canada and other sections which are supplied from that territory will have to pay $2 a thousand more for his lumber, in addition to the increases recently brought about—all of which makes buying now, prior to the effective date of the increases, quite attractive.

There is no estimate or fixed value for figured mahogany lumber or veneer. The special highly-figured wood is appraised for its individual value by those making and selling it, but with what is termed ordinary figure there is, with some mahogany people, a practice of adding $30 per 1,000 ft. to the price of plain mahogany for that which shows figure.

When it comes to lighting the factory during the dark mornings and evenings the right order of economy is generally found in the best equipment.

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Chapter 6—*Selection of Glue*

WOODWORKER PUBLISHING CO., LIMITED
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Veneers and Panels

The Veneer Room and Its Equipment, with Special Reference to Layout

(Submitted in Canadian Woodworker Essay Competition, No. 2)

By Albert Hudson, Hespeler, Ont.

VENEERING is an important part of a factory's operations, hence the veneer room should be equipped with the very best and most up-to-date apparatus obtainable. I knew of a veneer room where the equipment consisted of a carpet spreader, three presses, two glue pots, a few zinc cauls, twelve hand screws, and a few iron and wood clamps. However accomplished the man in charge may be, with such an equipment good results are impossible. Some factories have not sufficient veneering to warrant a large equipment; however, what they have should be of the best and up-to-date.

For a factory that specializes in veneered goods, an up-to-date equipment is necessary and profitable. Inferior work soon makes itself felt as the articles go through the factory, retarding the output all along the line. In the cabinet room and finishing room all this unnecessary worry and expense can be avoided by the exercise of careful attention in the veneer room. Given a veneer room with up-to-date equipment in the way of presses, glue spreader, copper heater, caul box, aluminium cauls, veneer jointer, re-drier, taping machines, etc., good work should be accomplished.

Taking the Equipment Separately

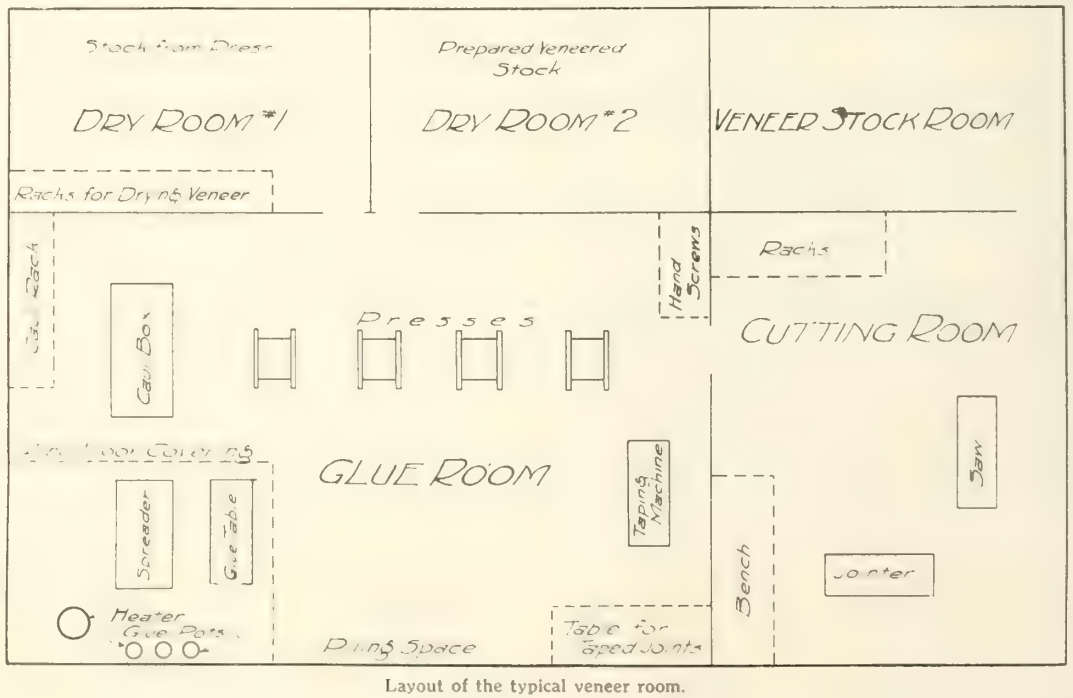
The Press.—I prefer the hydraulic because I think it has the advantage of simplicity in construction and operation, and is best of all types for veneer work.

Glue Spreader.—The variations in the different types of glue spreaders are not very great. Much, however, depends on the care given during operation, corrugated rolls being preferable to carpet. Cleanliness is very essential around these machines. More glue can be washed around the machine than is used in the veneering itself. The spreader should be washed down with hot water every night, thereby insuring cleanliness. The heater should be modern, having attached a thermometer and every available means so that the temperature of the glue can be kept uniform. This is very important.

The spreader and heater should be installed close together, and the heater mounted above the spreader, thereby enabling the glue to be drawn off through a pipe into the reservoirs of the spreader. It is wise to have the floor covered with zinc or corrugated iron for the spreader and heater to stand upon, this being better for cleanliness.

The writer knew a factory where the heater and spreader were apart and the glue carried by pails from the heater to the spreader, thereby causing waste of glue and loss of time. The caul box should be easy of access, but at the same time not in the way.

The Cauls.—Aluminium cauls are preferable to zinc. Aluminium cauls last longer, retain heat, keep straight, do not wear away in thin places and always leave the work good and clean. Do not allow the cauls to get too hot, or trouble will follow. Use prepared caul wax. There is no trouble in cleaning after it. Racks should be made to hold the cauls when not in use.



Layout of the typical veneer room.

The veneer jointer should be placed in a convenient position and kept in the very best condition. How often we see this machine neglected! I once heard a veneer man say when spoken to about his joints on the veneered goods, "Well, how can you expect anything different when every Tom, Dick and Harry is allowed to use the veneer jointer?" While this should be no excuse for poor joints there is more in that reply than appears on the surface. It is very discouraging to put planer knives in condition, then to find when one goes to use the machine that someone has been ahead, running over some gritty lumber. I fear that this is overlooked in many factories.

The Re-Drier.—Every factory does not have sufficient work to warrant the installing of such a machine. Veneer cannot be too dry. I knew of a factory that was continually having trouble with its veneer work; the trouble was wet veneer. Because the veneer producer is supposed to dry the stock thoroughly before it is shipped, that does not guarantee the veneer to be dry and ready for use. Some manufacturers think that the veneer may be used without re-drying, with every assurance of satisfaction. That was the mistake with the factory afore-mentioned. It is expecting something impossible to assume that with good drying at the mill dry stock is assured at the factory. Veneer is subject to climatic changes.

Where there is no re-drier, I would suggest that racks be built from the floor to the ceiling, placing the arms close together up and down, 24 in. or 30 in. apart horizontally. Place the sheets of veneer across the arms where they will dry out quickly. The racks could be built in the drying room where veneered stock is kept. This room should have a temperature of from 80 to 90 degrees Fahr. In my opinion there is a good argument in the interests of economy in favor of mechanical dryers.

The Taping Machine is another useful machine, especially to large veneer users. A factory that installs a taping machine will soon find what a profitable improvement it is.

In conversation one day with the foreman of a veneer room I asked him whether their people had installed a taping machine, "Yes, said he, and I consider that it is one of the best improvements in our veneer room to-day, it being both easy and quick."

Veneer users will find it possible to use much more narrow stock than formerly, and it should in many cases prove profitable.

From close observations on the part of the writer the taping machine is a decided improvement and a sure payer.

Another improvement in the veneer room is the provision of a small circular saw. Of course, all factories cannot do this, but where possible try it and watch the result.

There are other articles such as clamps, hand screws, etc., all of which should be ready at hand. If the threads of the hand screws are brushed with common black lead, they will work easily and the glue will not adhere to them. One frequently enters the veneer room and finds hand screws thrown on one side, with threads broken. This can be avoided by the above method. Hand screws and clamps should be placed in racks when not in use. No matter how efficient the equipment, if poorly arranged good results cannot be obtained.

Reproduced herewith is the layout of a veneer room. The equipment should be so arranged that every movement is a forward one. In the opinion of the writer the veneer department should be subdivided as per sketch. It helps to keep the department in good order.

The glue also is an important factor in the veneer room. This is a question that cannot be handled carelessly. To manufacturers I would put the question: are you receiving out of the glue the maximum value for which you are paying? Glue should be made fresh daily. More glue is spoiled from over-heating than any other cause. Glue should never be heated hotter than from 140 to 150 degrees Fahr. Even to-day some men in the trade think of heat and lots of it, both in the boiling of the glue and the stock to be glued. This is a mistake. The glue best adapted for the veneer room is a non-foaming, odorless, strong and slow-setting glue.

The following eight rules will help somewhat if placed in a prominent position in the veneer room:—(1) cleanliness; (2) measure glue and water separately; (3) soak the glue in clean water; (4) stir thoroughly; (5) dirty pots must never be used for glue; (6) remember that cooking glue over 150 degrees Fahr. kills the strength; (7) see that glue is dissolved before applying heat; (8) make fresh glue daily.

Another important factor is that of the men. One may often find good equipment and poor men, or good men and poor equipment. One cannot make up for the other. Care should be taken along this line of men. The foreman or man in charge should know his business in detail. A man of this description can work the room to decided advantage with men of lesser ability, and get good results. The writer knew of a factory where all "green" men were employed, the man in charge being no different from the rest. The result was poor work. The matching of the veneers, the jointing, in fact the whole work was inferior, causing unnecessary worry all through the factory. Some manufacturers are saving 50c and spending $1.00 along this line of labor.

It is not my purpose to argue in favor of the highly-paid man, but no man was ever paid too much who was paid what he was worth. What is wanted is a skilled workman at the head. Even where the most capable veneer room equipment is installed, the results depend largely upon the man in charge. A good man will so lead his men that the veneer room will run as a clock the whole week round. The better a man is provided for, the better he will be able to keep things running smoothly. After all, it is up to the man to make the very best use of the arrangements to get results. You will get out of your veneer room only what you put into it, and the results will repay the cost.

There has been considerable increase in what is termed the maximum speed for electric motors. It used to be that the motor people figured that 2,500 revolutions was about the limit, but now there is nothing unusual about finding one running up to 3,600.

There are many interesting side lines to both the veneer and the panel business, and it is the man who finds these interesting things and goes after them enthusiastically who is likely to come nearest to making a pronounced success of them.

It is generally better for the planing mill man to buy a proper veneer press for doors than it is to make one himself.

The Selection of Veneer Presses

"If you were going to put in a panel department, what kind of press would you use?" was the question put to a group of men, including a panel manufacturer, furniture manufacturer and a machinery man.

"A hydraulic or a hydrostatic press, of course," said the panel man.

"I would have a hydraulic and some hand presses, too," said the furniture manufacturer.

The machinery man looked as if he wanted to say something, started to, and then changed his mind and waited. By and by the inquirer turned to the machinery man and said:

"Well, come on, and tell us what you think about it."

"I think," said the machinery man, "that it depends a whole lot on what you intend to do and how you intend to do it."

"What has that to do with it?" inquired the panel man, "a press is a press, and where there is any quantity of gluing up to be done it is a waste of too much time and elbow grease to do it by hand, and when it comes to power presses I think the hydraulic press is the thing no matter what you want to do."

"Perhaps it is," the machinery man replied. "I know you get along with hydraulic presses and don't use any other kind, but just the same I recall that you let lots of work go by that you might do. I recall talking to you about special jobs in planing mill work and show window panels and you said you didn't want to bother with them because they call for special equipment and you wanted to reduce your equipment rather than add to it. Special panels of large size and of other shapes than flat call for the use of hand presses of various kinds, and if you had a room fitted up with hand presses you would find that there is lots of work, now passed by, you could take in and make something out of."

"Well," said the original inquirer, "can you tell me anything about what conditions of work or what circumstances make advisable the use of any one particular kind of press"

"That is a pretty large order," said the machinery man, "but maybe I can give you some light on the subject of the press question.

"First you must take into consideration that there are three general divisions of presses used in the veneer business, the hand press in all its different forms, the power press driven with a belt on tight and loose pulleys or with clutches, which is simply a modification of the hand screw press with power applied. Then we have the hydraulic or hydrostatic press which uses a chamber and ram and the well-known principles of hydraulics to apply pressure. Usually with it the pressure comes from above and is downward on the press.

"As to selecting a press for different uses, several factors enter. One, of course, is the quantity of work to be done. Where the quantity is limited and the variety is wide hand presses naturally have the preference. They cost less and are easier to handle and can be spread out so as to take in more dimensions. For this reason planing mill men and practically all users of limited quantities of veneer stick pretty closely to the hand press in various forms. Others with somewhat larger quantities use both hand presses and the power driven presses which are simply a modification of the hand press with belt power attached. They can do a wide range of work with these and do it satisfactorily.

"Ordinarily one would argue that where there are large quantities of flat panels of practically uniform size to be made, the only proposition worth entertaining is that of using hydraulic presses. Yet in the face of all this, I know it to be a fact that a concern making enormous quantities of flat plain built-up work practically uniform in size uses nothing but hand presses. It has a perfect sea of these presses, an immense room like a big warehouse practically full of them with little runways between for putting in and taking out stock, and it keeps quite a crew of men busy screwing down and loosening up these presses.

"There, you might argue, is a place where the hydraulic press or the power press should be doing the work, and it is a waste of time and elbow grease to be doing it with hand presses. It suggests the idea that these people may be big factors but they are behind the times. That, however, is not the case, for these people are very progressive. The truth is another factor enters, one that perhaps you folks have not given consideration to. They use a glue mixture that will set in a very short time, say from an hour and a half to three hours. Instead of using hydraulic or other power presses for squeezing the stock together, and then clamping it up in forms and running it to one side till the glue sets, they simply provide an abundance of hand presses, screw the stock down in the presses and let it stand there until it sets. They provide enough of these presses so that before they are all filled the first ones are ready to open up. Hence it becomes a sort of continuous process of putting in stock on one side and taking it out on the other, and by the use of these presses in this way they eliminate entirely the work of clamping the stock up in forms and trucking it to one side to stand while the glue sets.

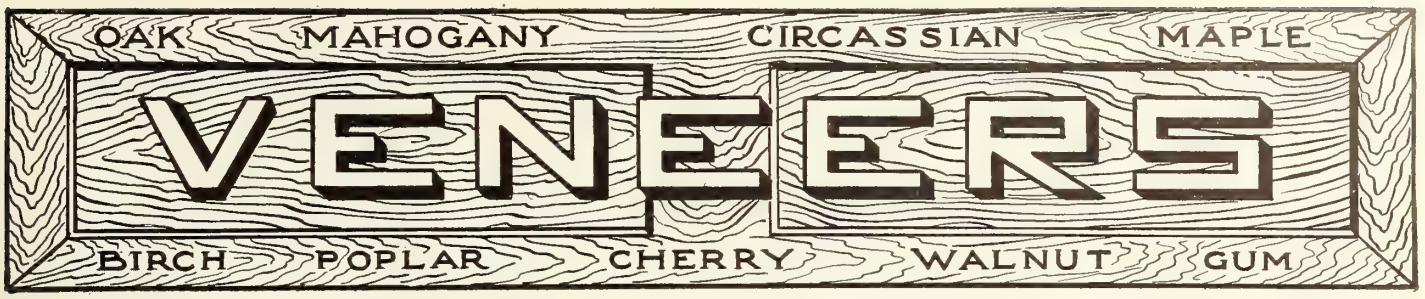
"So you see there are many factors which enter into this, and glue is one of them. Incidently it should be mentioned that we are developing many new things in the glue line that cut some ice in the matter of presses. Some call for special hot presses, some for special shapes and forms that it is difficult to handle on any kind of a hydraulic or power proposition.

"Wherever there is work enough and it is practical to apply mechanical power it is generally advisable to do so. Whether that power should be hydraulic or applied to screw presses with a driving gear is a matter open to some debate.

"One of the strong points claimed for the hydraulic press is not merely that it is a powerful press and can be made to exert all the pressure required, but it is easy to attach a pressure gauge to it so that the user may know positively just what pressure he is using. This is undoubtedly an important point, too, for positive knowledge of the amount of pressure used is a good thing.

"The makers of the screw power press, though, claim that the gauge registry of a hydraulic press is not a register or a record of the pressure per square inch applied to the surface of stock in the press. It is not either, but it is practical to figure out from the pressure used the amount of pressure that is being applied per square inch of surface of the stock in the press. Even with this, though, there is some uncertainty. Leaving out entirely the matter of friction

(Continued on page 40)



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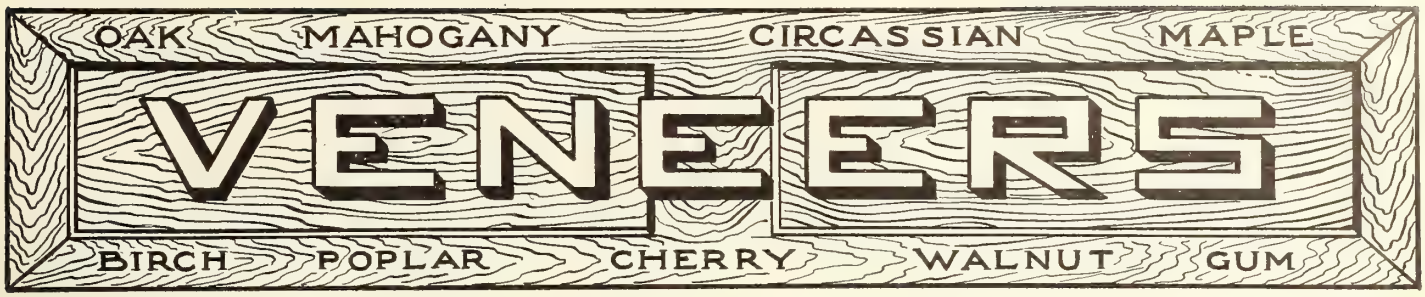

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1 "	8/4	"
1 "	10/4	"

RED GUM

Plain

4 cars	4/4,	1's and 2's
2 "	5/4	"
1 car	6/4	"
1 "	8/4	"
1 "	10/4	"
2 cars	4/4	No. 1 Com.
1 car	5/4	"
1 "	6/4	"
1 "	8/4	"
1 "	10/4	"

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Plain and Quartered Red and White Oak always in stock

We specialize on

Poplar

cross-banding and backing

Veneer

Highest Grade — Right Prices

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VENEERS

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WISCONSIN - BIRCH - OAK
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All Thicknesses
Log Run or Dimension Stock

PANELS

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MAHOGANY - WALNUT - BIRCH - ELM
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All Thicknesses
All Sizes
All Lengths
All Widths

Let us figure with you.

Wisconsin Seating Co.

Manufacturers

NEW LONDON, WISCONSIN, U.S.A.

(Continued from page 36)

and the loss in transmission, there enters the question of thickness, of the amount of stuff that may be piled in a press at one time. Given material of the same dimension if one press full is built up of a thickness of six inches, while another has twice the quantity making up a thickness of twelve inches, there is certainly some difference. Just what difference or how the pressure distributes itself through varying thicknesses is a matter that it is a little difficult to determine satisfactorily.

"The question of pressure is one thing that we have very little definite information on. Every once in a while we hear of a piece of work being spoiled through excessive pressure causing a spreading of the core body or the mass of veneer and the opening of joints. Yet we find ourselves lacking in specific information when we undertake to investigate and analyze these. There is not enough positive record of pressure used; neither is there other definite information. Sometimes it may be the shape of the forms or cauls, and at other times it may be carelessness in matching and fitting up stock in the press that causes spreading, so we are left to guess at quite a lot of it.

"Some authorities claim that the only harm which can be done by extra pressure is the crushing of the wood—that until we get pressure enough to cause crushing of the wood there is no harm and no objection to high pressure. This point is probably open to debate. The writer has examined some veneer work that seemed to suffer from too much pressure. The pressure seems to have forced the glue out until the glue joint was starved and did not hold well. Moreover, some of the best glue work has been done with hand presses and rather light pressure as compared to some of that used in hydraulic press work.

"So you see this question of what kind of presses to use is a complex one that is governed by many different factors. One thing, however, which is more important than the method of applying pressure in the modern presses, is the means provided for getting stuff into and out of the presses. If you are putting up work that must be clamped in forms and set aside while the glue hardens you will find that this putting in and taking out involves more time and work than that of putting on and taking off pressure, and in selecting presses this feature should be given serious attention. You can generally get the pressure on and off easier than you can get the material into and out of the presses. Study your material, what you intend to make, how much and how long it will have to stand aside, and try to get a combination that will lighten the work of handling as much as practical. Then you will probably find, if you are doing a wide range of work, that you will have use for both power and hand presses. The matter of choice between belt drives and hydraulic will depend some on personal preference, some on the first cost, and some upon the quantity of work to be done. The power driven screw presses cost much less in the beginning and fill a sort of general middle ground between the hand press and the massive hydraulic.

"But after paying due respects to the belt driven power press and the more expensive ponderous hydraulic, don't forget that the little old hand press always has been and always will be a big factor in the veneer trade."—Hardwood Record.

Practical Problems of Kiln Drying

AN interesting paper on "Kiln Drying" was read by Mr. Harry Hunter, Indianapolis, Ind., before the Ninth Annual Convention of the National Veneer and Panel Manufacturers' Association at Chicago recently. Discussing the troubles resulting from improper drying, with their causes and the conditions producing them, Mr. Hunter said:—

"The troubles resulting from improper drying, which affect the panel manufacturers and a part of which are common to all manufacturers of wood products, are blistering of veneer, veneer shrinkage, opening of joints, warping, case-hardening, honeycombing and checking. As you all know, case-hardening honeycombing and checking result from excessive heat or lack of moisture or from both, the surface drying first and preventing the escape of moisture from the centre of the stock. The other troubles are caused by under drying. I do not intend to convey the idea here that improper drying is always the cause of all these difficulties. Part of them may, at times, be caused by other things regardless of how the product is dried. But I do say that where the stock has not been properly dried some of these troubles will result.

"Unsucessful drying is the result of improper conditions as to heat, humidity and circulation in the drying chamber. These conditions may be all or some one or more of the following: Insufficient humidity, insufficient circulation, excessive heat, lack of uniformity as to heat, humidity and circulation in all parts of the kiln, and the variation of these conditions from time to time during the drying period. While it is perhaps not possible to dry each individual piece of wood in the same degree, it is certainly true that approximate uniformity can be attained only where the conditions are uniform throughout the drying chamber. The temperature cannot be permitted to vary. Likewise the amount of moisture must be uniform throughout the room. There must be a continuous and rapid supply of fresh air to all parts of the kiln and the prompt removal of the air after it has been used. The problem, therefore, is first to produce these conditions, and second, to control them once they are produced. To produce the conditions as to heat and humidity, it has been found best to heat the air to the desired temperature and humidify it to the proper degree before it is permitted to enter the drying chamber. This, of course, cannot be done where the radiation is inside the drying room proper. There are additional objections to having the radiation in close proximity to the drying product. The best results in rapid and uniform circulation can be obtained, I believe, by having both the intake for fresh air and the outtake for impure air on the floor line. In this way the warm air rises rapidly and passes to all parts of the room, while the cooler impure air sinks to the floor line and is removed. This insures a constant and ever-changing supply of fresh air, heated and humidified to the proper degree, and brings it continuously into contact with the work to be dried. The control of circulation as well as that of heat and humidity should be taken care of automatically.

"I desire at this point to emphasize the importance of humidity in any drying system and that there must be some provision made for producing and controlling

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ORDER NOW

Sizes in Stock:—

60 x 40 x 4 m/m (3/16 in. scant)
49 x 41½ x 2 " " "

60 x 40 in 3/16 in full and ¼ in.
60 x 45 " " "
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The Hutchinson Combination Woodworker

The saw can be set to cut at any angle and can be raised or lowered 8 inches. This operation makes no difference to the belt as is the case with other makes of machines. There is no overhanging slide. The table is clear of all obstructions; all work is in full view, and is operated with 1½ H.P. Motor.

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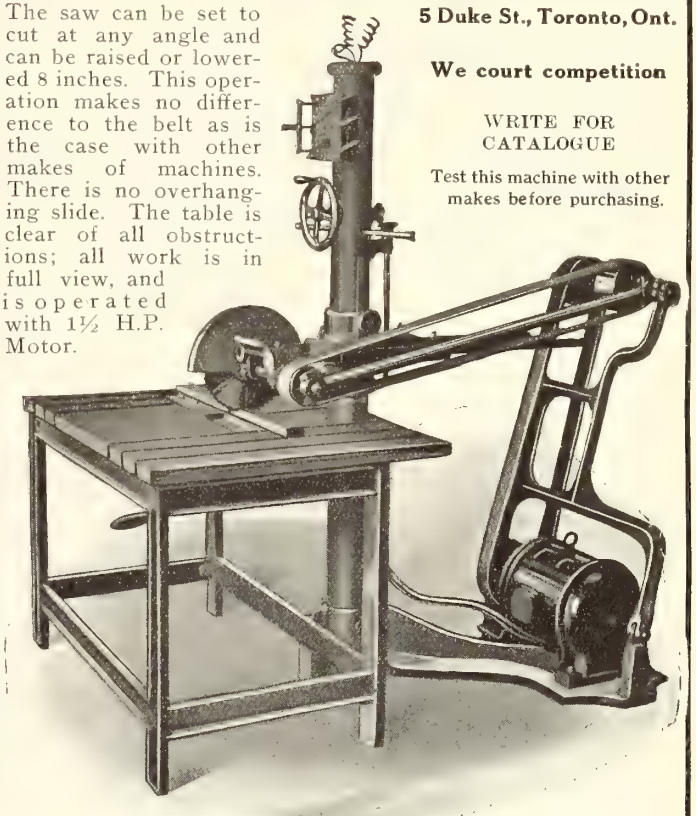
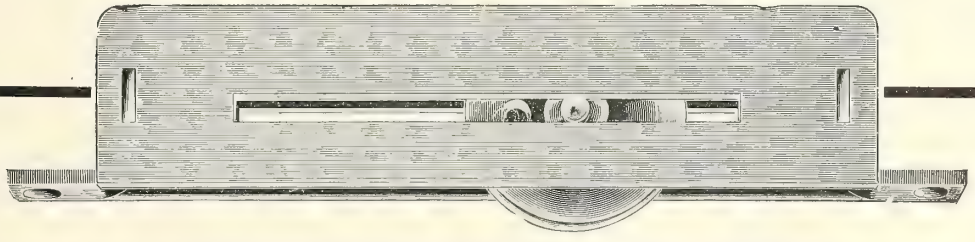
Test this machine with other makes before purchasing.





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A sheave for large heavy sliding doors, perfect in action, with the least possible wear. Steel pin travels with the wheel, on edge of best quality steel casting.

We can best convince you of the practicability of these sheaves if you will make a trial of them.

Manufacture a complete line of store fixtures and show case Hardware.

Reflector and Hardware Specialty Manufacturing Company
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it. The amount of moisture naturally in the air is uncertain, varying with the outside conditions, and cannot be depended upon. There must be some method for producing it, but any arrangement which provides for it without accurate control and regulation will not produce results. Moisture in the drying air is responsible for the open pore and no wood product can be successfully dried without it. Without an open pore, the centre of the stock cannot be properly dried while the outside case-hardens and honeycombing sometimes results. On the other hand, stock dried with open pore can be more easily worked and presents a better surface for the adhesion of glue. Veneer and cut-stock will be more pliable, flatter, and will have good color. The stock can also be worked in less time, with less waste and less expense.

"With the drying conditions regulated and controlled as already indicated, lumber can be best dried at a temperature of 10 degrees F., with the humidity held at 57 to 63 degrees. In drying panels, the temperature should not be so high, 120 degrees being the limit.

The following results were obtained from the tests made in a factory which was having most of the troubles above enumerated. They were obtained under the conditions described as being essential to proper drying. The first test was upon a number of panels taken from the glue room. The first moisture test on the core stock showed a variation in moisture content from 3 to 14 per cent. The first moisture test on the veneer and cross-banding showed from 6.7 to 8 per cent. of moisture. After being re-dried under the above described conditions for 15 hours, the core stock showed a variation of from 3.5 to 4.5 per cent. in moisture and the cross-banding and veneer showed from 2.9 to 5 per cent. After the panels dried laid, they weighed 65 lbs. 4 ozs. After being dried for 22 hours, at 120 degrees, the weight was 63 lbs. 8½ ozs., a loss of 1 lb. 11½ ozs. or an average loss to the panel of 3.4 ozs. After the panels were dried, they showed a moisture content of from 4.7 to 6.7 per cent., an average of 5.75 per cent.

"A test of 20 oak boards taken from the tempering shed to be used as core stock, showed a moisture content ranging from 2.9 to 19.4 per cent. Eighteen maple boards taken at the same time, showed a variation of from 3 per cent. to 6.7 per cent. moisture content. These boards were taken from the same piles at the same time and had all been kiln dried. After being re-dried for 36 hours at 140 per cent., the oak showed a variation in moisture content from 2 to 3.8 per cent., an average of 2.7 per cent. The maple boards showed a variation of from 1 per cent. to 3.6 per cent., an average of 1.6 per cent. This stock was worked up into six 5-ply oak panels, size 18 x 33, and six 5-ply mahogany panels of the same size. After being laid, the oak weighed 57 lbs. 4 ozs. and the mahogany 52 lbs. 15½ ozs. After drying, the oak weighed 55 lbs. 4 ozs. and the mahogany 50 lbs. 13½ ozs. The loss of moisture on the oak was 2 lbs. ½ oz., an average of 5.4 ozs. to the piece. On the mahogany, the loss was 2 lbs. 2 ozs. or an average of 5.6 ozs. to the piece. The moisture content in the oak after drying was 7 per cent., in the mahogany 7.1 per cent."

Propellers for aeroplanes are now being made of built-up layers of spruce, with mahogany centres. In the course of time built-up wood will likely enter more extensively into this and other work calling for extreme lightness, with the greatest possible strength, for built-up wood gives more strength for the same weight than it is possible to obtain in the solid wood.

News of The Trade

The Medicine Hat Planing Mills, Limited, lost their stock room and its contents recently by fire. The loss is estimated at $10,000.

The Prince Rupert Sash & Door Company, Limited, has been wound up on the petition of the Burrard Lumber Company, Limited.

The E. R. Tait Shingle Company, Limited, has been incorporated in British Columbia, with head office at Vancouver and an authorized capital stock of $50,000.

The Hillsboro' (P.E.I.) Woodworking Company's plant was destroyed by fire recently. The factory had been shut down for some time, and the origin of the fire is a mystery. The loss is estimated at $7,000.

At Listowel, Ont., the planing mill owned by Messrs. Oliver & Ellis was destroyed by fire recently. The loss, which included planing mill, stable and coal and wood sheds, amounted to $2,000, half of which was covered by insurance.

The Sash and Door Factory owned by Messrs. Gingras & David, Bordeaux, Que., has been destroyed by fire. The loss to building, machinery and stock is estimated at $50,000. It is not known as yet whether the firm will rebuild in the near future.

As already announced in these columns, the Gum Lumber Manufacturers' Association will hold their annual meeting in the Hotel Gayoso, Memphis, Tenn., on January 16. The Secretary is Mr. J. M. Pritchard, from whom full particulare are obtainable.

Reports from Chatham, N.B., state there is every reason to believe that the season's cutting of lumber in New Brunswick this year will show a substantial increase over that of last season. Those in a position to judge are of the opinion that manufactured lumber is at present selling at a higher price than has prevailed for several years.

The Ball Furniture Company, Limited, has been incorporated with a capital stock of $125,000 and head office at Hanover, Ont., to manufacture and deal in chairs, furniture of all kinds, lumber, building materials, etc. The provisional directors include Mr. Robert James Ball, Mr. John Ball, and Mr. Milton Leonard Ball, all of Hanover, Ont.

In the district of Algoma, Ont., it is the intention of the Wells-Higman Company, of Traverse City and St. Joseph, Mich., to erect a saw mill, shingle mill, and veneer plant in the near future. The company recently purchased 32 sq. miles of virgin timber situated on Batchawaung Bay in the townships of Tilley, Archibald and Tupper. They are now conducting logging operations on these limits.

Business Notes

The following inquiries relating to Canadian trade have been received. The names of the firms making these inquiries, with their addresses, can be obtained by those specially interested upon application to "The Inquiries Branch, Department of Trade and Commerce, Ottawa."

1255. **Pianos, organs, etc.**—A Glasgow wholesale piano dealer is open to negotiate for Canadian agency, as buyer, factor or agent.

1289. **Furniture, bedroom suites.**—A South African commission agent is prepared to take up agency for Canadian-made bed-room suites in knock-down state. Immediate correspondence with full particulars requested.

1245. **Furniture.**—A representative in Paris is anxious to get in touch with manufacturers of furniture of all kinds, in bent wood.

1246. **Furniture.**—A firm of manufacturers' agents in Paris desires to communicate with manufacturers of all lines

WOODWORKING MACHINERY

More than 1,000 Second-hand Machines, Renewed and Guaranteed.

52 Lines of New Machinery the Largest Stock in the World.

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"Andrews" Dried Lumber IS BETTER LUMBER

"ANDREWS" Products Represent Perfection—Reliability—Results

"Andrews" Moist Air Lumber Driers — CONDENSING or VENTILATED

Perfect Transfer Cars
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Write for Information

DRIER DEPARTMENT

The A. H. Andrews Co.
115-117 South Wabash Ave.
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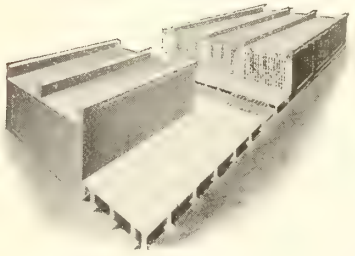
MORTON HUMIDITY SYSTEM POCKET KILNS



This is the ideal type of kiln for any firm that has numerous kinds and thicknesses of lumber to dry.

Perfect Control and Rapid Results build a kiln that fits your special requirements.

Write for our 3 Complete Catalogs and Special Folder-60 F.

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Every kind and form of

DRYING LUMBER

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QUALITY DRYING
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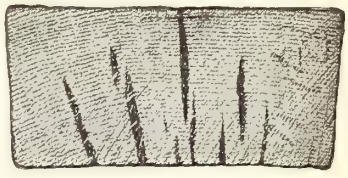

Plain Sawed Oak

Mills in West Virginia and Kentucky

Wilcox & Knapp
Conneautville, Pa.

Quotations Cheerfully Furnished

A New Year's Resolution

I shall carry my patriotism into my business, and so conduct it that every transaction shall, as far as possible, contribute to the upbuilding of natural resources.

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603 Eastern Townships Bank Building,
MONTREAL

of furniture in bent wood and receive catalogues and quotations c.i.f. Havre.

1278. **Woodenware.**—A South African commission agent makes inquiry for agency in Canadian woodenware of all kinds. Immediate correspondence with full particulars is required.

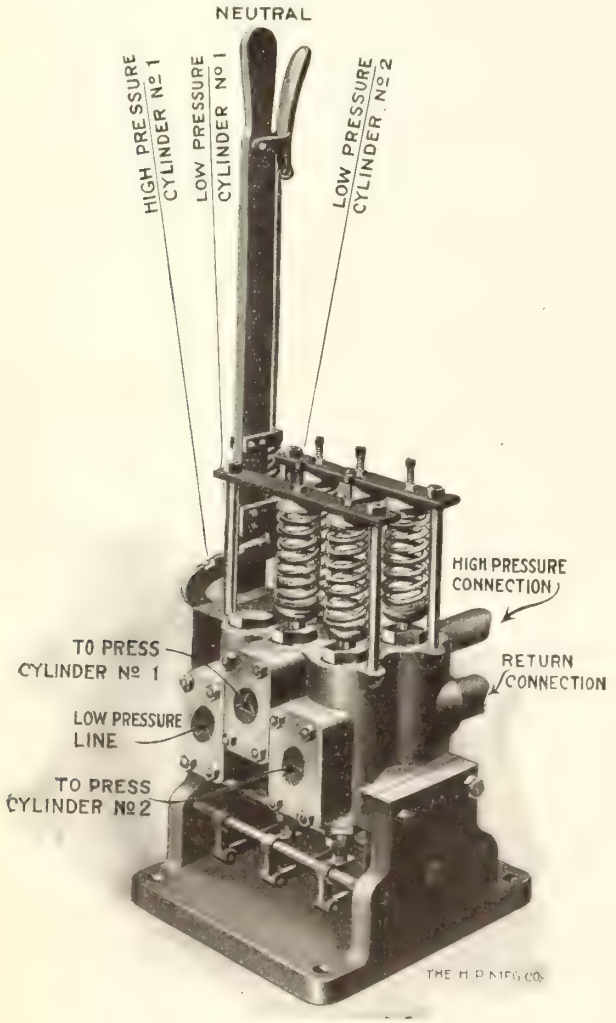
1266. **White pine doors.**—A firm in New York desires the names of manufacturers in Canada in a position to export white pine doors.

1287. **Chairs.**—A South African commission agent is prepared to take up agency for Canadian-made medium-priced chairs. Immediate correspondence with full particulars is requested.

26. **Furniture.**—Inquiry is made by a commission agent covering all large South African centres from time to time, for agency in Canadian-made furniture of all kinds. Immediate correspondence with full information, also illustrated catalogues with f.o.b. prices St. John or Montreal, required.

New Hydraulic Valve

Operators of hydraulic equipment of the double acting character have experienced much difficulty in the past in obtaining the right kind of pressure control with their valve



Five-way high and low pressure double acting balanced poppet operating valve.

equipment. This trouble has been experienced with all presses on which the ram is forced in both directions by hydraulic pressure. This kind of press may be either inverted, horizontal or vertical.

To meet this demand The Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, has designed and is placing on the market a five-way high and low-pressure double-acting balanced poppet operating valve, which has many unique and interesting features. The accompanying cut illustrates the new valve.

Its operation is described as follows: The low pressure is admitted to the first cylinder, leaving the second cylinder open to the return line. When the low pressure has done its work in the first cylinder the high pressure is turned in. A check prevents the liquid from the high pressure line from flowing into the low pressure line. The valve can then be shifted to the position which applies low pressure to cylinder No. 2 and releases cylinder No. 1. A similar valve is made with another position which applies high pressure to cylinder No. 2 with No. 1 still open. In most cases the last position is unnecessary, as the work of cylinder No. 2 is done at low pressure only as in the case of auxiliary return cylinders. On account of the length of the operating lever it is necessary for the operator to stand above the level upon which the valve rests.

The valve has five stems and checks and is suitable for a pressure up to 5,000 lbs. It is constructed from a special grade of bronze made in the company's own brass foundry from patterns constructed in their own pattern shop. This valve is a good addition to the already large and varied line of hydraulic valves and fittings manufactured by The Hydraulic Press Manufacturing Company. This company constructs hydraulic valves and fittings suitable for all kinds of hydraulic equipment on which the pressure runs up to 10,000 pounds.

Lumber and its Uses is the title of a comprehensive book from the pen of R. S. Kellog. It contains in tabular form much useful information on the resistance of all kinds of lumber to various strains. Grades and standard sizes adopted by the different lumber manufacturers' associations are also dealt with, as are lumber preservatives and finishes. In short, this work gives considerable aid to the determination of which kind of lumber is best suited to a given use. The publishers are The Radford Architectural Company, Chicago, Ill.

The mill owners of Victoria, B.C., are urging upon the city council the advisability of adopting wood paving instead of asphalt, in this way assisting the mills to keep busy. The argument is a powerful one, but the council is already in possession of one still more potent—the fact that wood paving is being adopted in many of the chief cities of Great Britain and the United States.

From St. John, N.B., comes the encouraging news that nearly all the sawmills in that Province are in operation and several working at capacity. The outlook for the woodworking trade in New Brunswick is therefore distinctly satisfactory, especially as this time last year many of the mills were obliged to close down.

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Mills: KNOXVILLE, TENN., WALLAND, TENN.
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All kinds of

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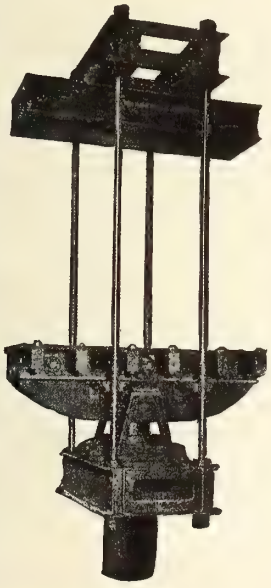
Mills at ***Owensboro, Ky.,*** and ***Memphis, Tenn.***

Hydraulic Veneer Press



We build these presses in all sizes and styles for all kinds of Veneer work

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PLAIN RED GUM		QTRD. RED GUM	
4/4 1s & 2s	171812	4/4 1s & 2s	12000
4/4 No. 1 C.	433970	4/4 No. 1 C.	49187
5/4 1s & 2s	46339	5/4 1s & 2s	12530
5/5 No. 1 C.	30140	5/4 No. 1 C.	15682
6/4 1s & 2s	37375	6/4 1s & 2s	10000
6/4 No 1 C.	71172	6/4 No. 1 C.	27584
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4/4 13-17 in. Boxboards 28718
4/4 18 in. and up Panel 33905

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Cincinnati, Ohio

OAK

4/4, 5/4, 8/4, 12/4 and 16/4 No. 1 Com. and Fas.

DIMENSION STOCK

We give special attention to the manufacture of dimension oak and are prepared to cut stock to order.

CHESTNUT

4/4 and 6/4 all grades.

BASSWOOD

4/4 and 5/4 Log Run

YELLOW PINE

5 cars 4/4 Short Leaf Steam Dry Finish
3 cars 4/4 Short Leaf Air Dry Finish
2 cars 4 in., 5 in. and 6 in. Turning Squares

The Talbert - Zoller Lumber & Veneer Co.

CINCINNATI -:- OHIO

Manufacturers of

Ohio and Indiana High Grade Oak Lumber and Veneers

We have at our Cincinnati mill the following stock in Dry shipping condition:

2 cars 8/4 1st and 2nd Plain White Oak.
3 cars 4/4 1st and 2nd Plain White Oak.
1 car 4/4 1st and 2nd Plain Red Oak.
1 car 4/4 No. 1 Common Plain Red Oak.
1 car 5/4 1st and 2nd Plain Red Oak, 11 in. and up.
1 car 16/4 1st and 2nd Tough White Ash.
1 car 10/4 1st and 2nd Tough White Ash.
5 cars 4/4 No. 1 Common Tough White Ash.
2 cars 4/4 No. 1 Common Qtd. White Oak Strips.

Also large stock of Quarter Sawed Oak Veneers of the finest texture, color and figure. Send for Sample and Price.

We do not sell anything but our own manufacture.

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Anything in

Black Walnut Lumber

SEND US YOUR INQUIRIES

Soft Yellow POPLAR

Extra Wide 1, 2, 3 and 4 inch 5/8" PANEL STOCK
6" x 6," 7" x 7" and 8" x 8" Squares

Hardwoods of all kinds
Mahogany—Oak
Hickory Lumber, Hickory Axles, Cypress

Charles F. Shiels & Co., Cincinnati, O.

A New Year's Resolution

Resolved that we will only use Oak that is soft in texture and even, white in color as manufactured

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Hardwood Manufacturers and Dealers

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—We make a specialty of—

Mills:
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Soft Texture Red and White Oak

Quartered, Sawed and Plain

Also manufacture and carry in stock a large assortment of

DRY — POPLAR — ASH — CHESTNUT — BASSWOOD

Can supply in any thickness from 4/4 to 16/4 **Wire our expense if in need of any of above stock.**

Shawnee Lumber Company

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OUR SPECIALTY IS OAK

WE carry large stocks of Oak, Poplar, Chestnut, Hickory, Maple, Basswood and Gum.

If we haven't in stock what you want, we can saw it for you and ship promptly right from the saw.

We operate our own mills.

Write us today and send us your inquiries.

Immediate Shipment

West Virginia Stock

Thoroughly Dry and Well Manufactured

1 car 4/4 1s and 2s, Plain White Oak.
4 cars 4/4 No. 1 Common Plain White Oak.
2 cars 4/4 No. 2 Common Plain White Oak.
1 car 4/4 No. 1 Common and Better Plain White Oak. Worm holes no defect.
1 car 6/4 No. 1 Common Plain White Oak.
6 cars 4/4 S. W. Chestnut.
1 car 5/5 S. W. Chestnut.
4 cars 6/4 S. W. Chestnut.
1 car 8/4 S. W. Chestnut.
3 cars 4/4 No. 3 Common Chestnut.
1 car 4/4 No. 1 Common and Better Chestnut.
½ car 8/4 No. 1 Common and Better Chestnut.
1 car 4/4 Saps and Select Poplar.
2 cars 4/4 No. 2 Common and Better Poplar.
1 car 5/4 No. 2 Common Poplar.
1 car 6/4 No. 2 Common Poplar.
1 car 4/4 No. 2 Common and Better Birch.

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The "Canadian Woodworker" Buyers' Directory

For Alphabetical Index see page 4

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Canadian Linderman Machine Company, Woodstock, Ont.

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Whitney & Son, Baxter D., Winchendon, Mass.

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Pryibil Machine Company, P., New York.

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Petrie, H. W., Toronto.
Pryibil Machine Co., P., New York City.

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Williams Machinery Co., A. R., Toronto, Ont.

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BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Sheldons, Limited, Galt, Ont.

BLOW PIPING
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

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Pryibil Machine Co., P., New York City.

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Carborundum Co., Niagara Falls, N.Y.

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Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
Palmer & Sons, A. E., Owosso, Mich.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
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CUT-OFF SAWS
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Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Ober Mfg. Co., Chagrin Falls, Ohio.
Pryibil Machine Co., New York.
Simonds Canada Saw Co., Montreal, Que.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

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Elliott, W. A., Toronto.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

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Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.

DOWEL MACHINES
Chicago Machinery Exchange, Chicago.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.

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Andrew Co., A. H., Chicago, Ill.
Grand Rapids Veneer Works, Grand Rapids, Mich.
Morton Dry Kiln Co., Chicago, Ill.
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

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Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Invincible Blow Pipe Company, Toronto.
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Simonds Canada Saw Co., Montreal, P.Q.
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Pryibil Machine Company, P., New York.

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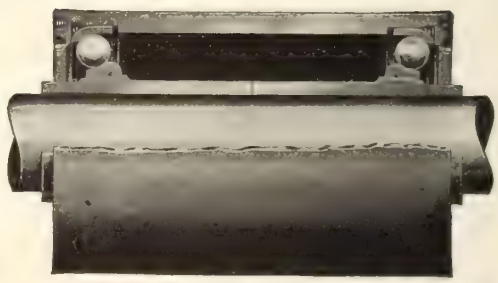

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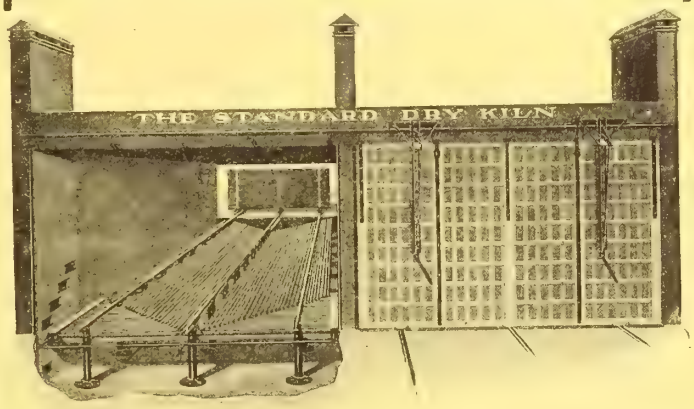

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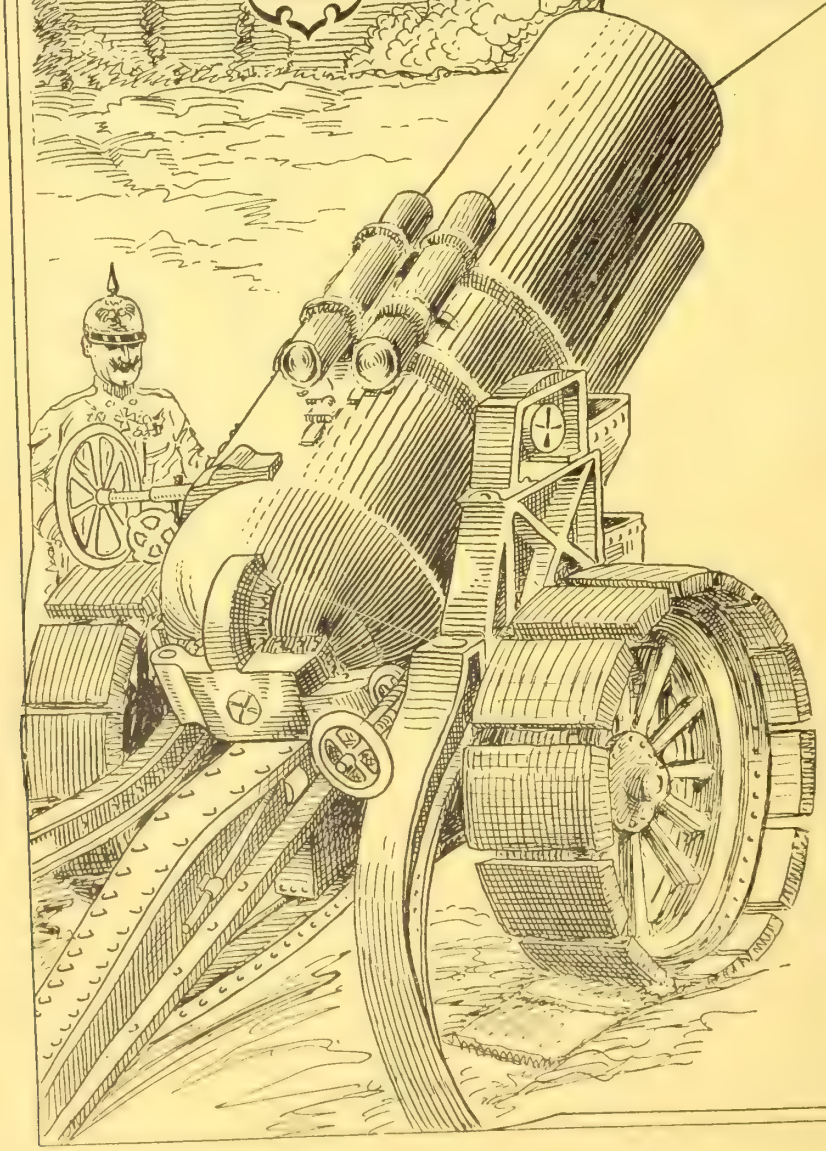

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Canadian Woodworker Essay Competition—See Page 9

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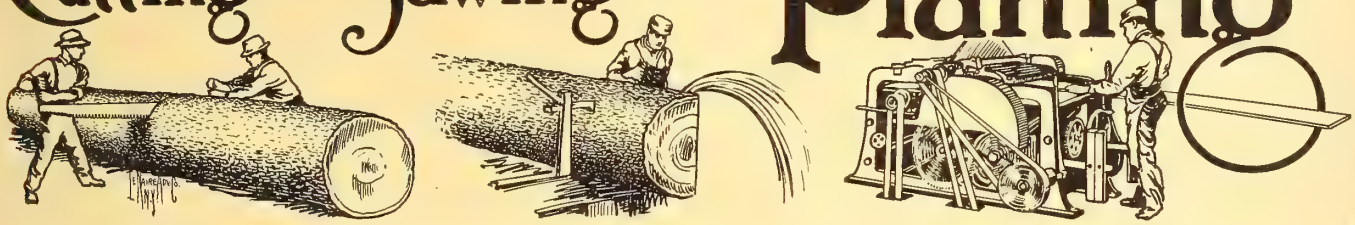
and
Furniture Manufacturer

Cutting — Sawing — Planing



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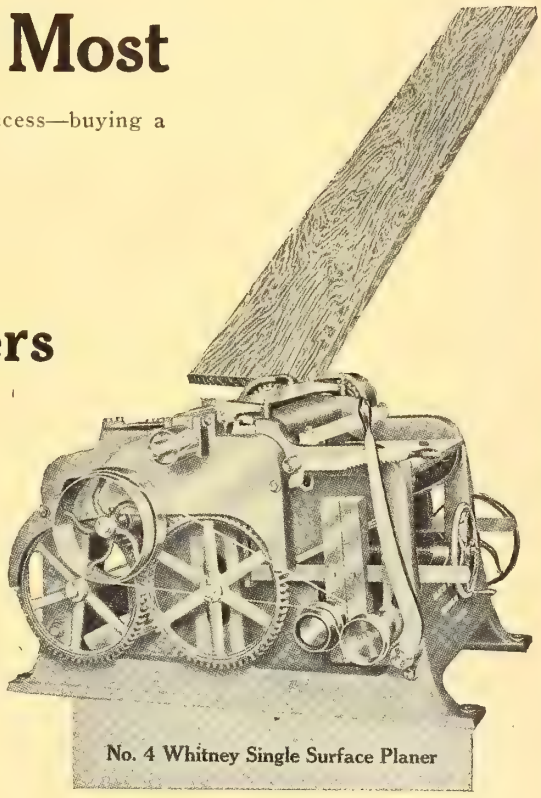

No. 4 Whitney Single Surface Planer

BAXTER D. WHITNEY & SON - Winchendon, Mass.

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North Pacific Coast Office:
Stetson-Ross Machine Works, Seattle, Wash.

Canadian Representatives:
H. W. Petrie, Limited
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Tough and Tenacious Tannage

MAKES

"Crown" Planer Belting

Ideal for heavy fast work where rough wear and heat are present

Different tannages of hides impart different properties to the finished leather. The hides used in "Crown" planer belting are tanned to produce a very tough and tenacious leather that will stand the roughest usage without injury. "Crown" planer belting is ideal for high speed work on planers, matchers, etc., and will stand extreme frictional heat. It may be run under heavy loads at high speed over small pulleys without starting any joints or otherwise being harmed.

We tan all our own leather in our own tanneries to manufacture our belts. We have been established since 1876 and all the discoveries of modern science cannot refute our old slogan, "Leather, like gold, has no substitute."

Write us for prices and state where belt is to run.

Made in Canada

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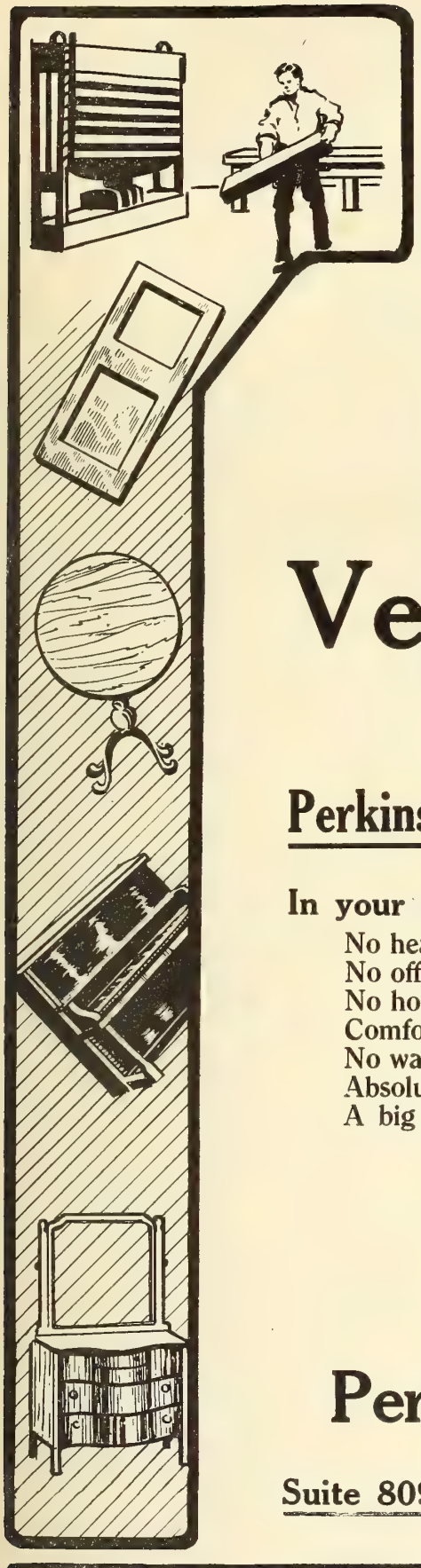

Glue Room Economy

When You Use

Perkins Vegetable Glue

You will have

Perkins Quality - Absolutely Uniform

In your glue room

No heat for application
No offensive odor
No hot cauls
Comfortable temperature
No waste glue
Absolute uniformity
A big saving in cost

In your product

Veneers laid to stay
Unaffected by climate
No blisters from standing
Will stand ocean voyage
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Highest quality
Repeat orders

We prove it in your own factory

Our Canadian representative will call and explain our proposition

Perkins Glue Company

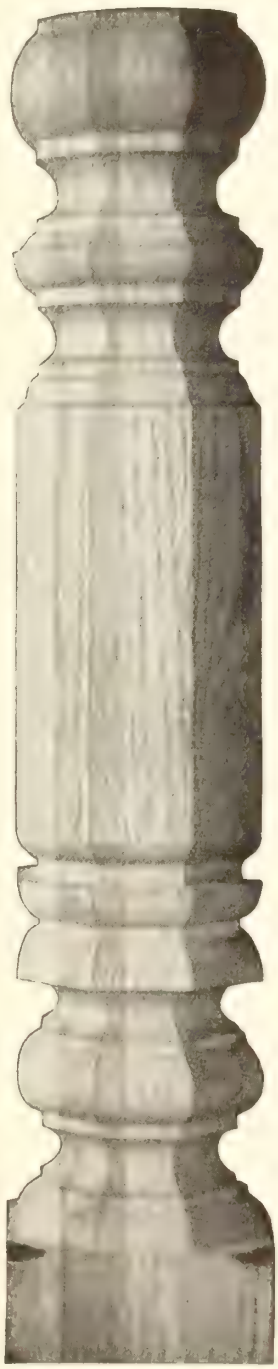
Originator and Patentee of Vegetable Glue

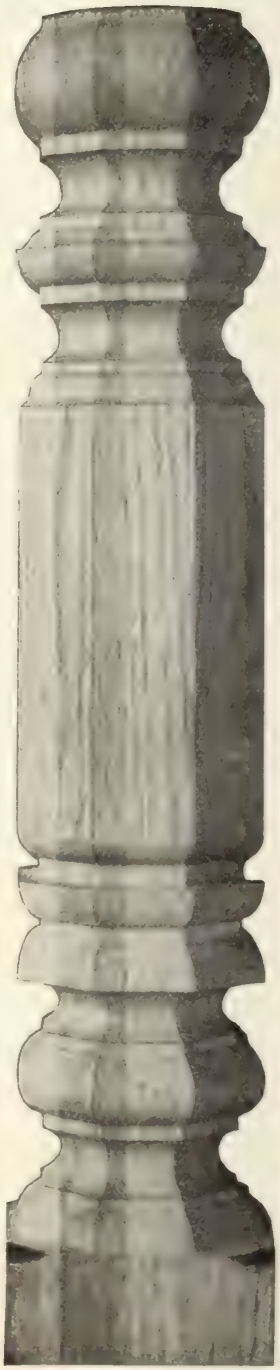
Suite 809 J.M.S. Bldg. - South Bend, Indiana

Perkins Glue

The Better Selling Styles of Furniture Call for Square, Hexagon, Octagon and Like Designs

TRUE! You are Making Many of the New Designs — BUT — Are You Making Them by the Twenty-Times-Better Way?





It's tedious, expensive work to make the much-called-for square, hexagon and octagon designs, or even plain round turnings, by the old methods.

There's a better way than band saw, shaper, or hand turning methods—the "Twenty-Times-Better Way."

An Improved New Machine Makes Any Design—Any Turning

Three distinct advantages will follow the installation of our new machine in your plant:

1. Your designer can give his imagination full sway—he can get up any desired design, knowing that it can be turned out economically.
2. Any ordinary shop man can operate this machine, producing completed turnings in 30 seconds' time—he has only to place stock between centers and push over a lever.
3. The work of the machine will be smoother and more uniform than is possible by the old methods—the knives of our patented cutter-head are set at an angle that makes a true shear cut.

Because of these advantages, this new machine method is easily a "Twenty-Times-Better Way" than the old half-machine, half-hand methods.

Let Us Send You a Sample

Take the first step toward better and more economically produced designs. Let us send you a sample of work, similar to what is being turned out in some of the foremost plants, where our new machine is in operation. The sample shows round, square and octagon work on one piece—it's interesting.

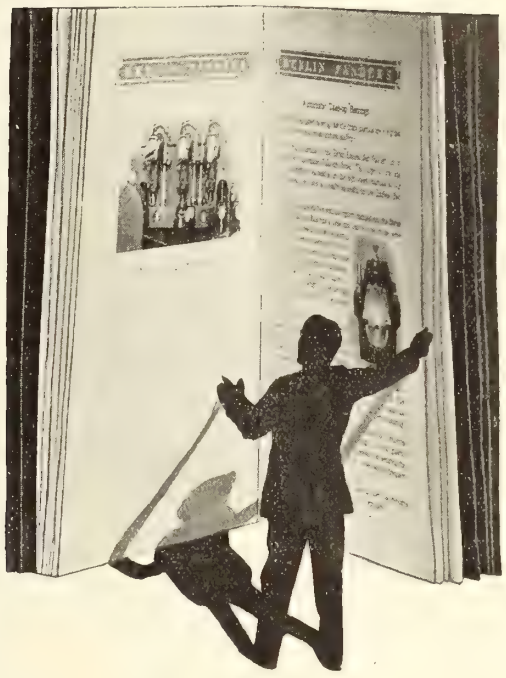
Berlin Specialties Department of the

Berlin Machine Works, Limited, Hamilton, Ont.

and Beloit, Wisconsin, U. S. A.

Successors to

Wood Turning Machine Company, Beloit, Wis.



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The New Berlin Sander Catalog—

If you require Sanders which will give you the greatest possible accuracy, output, and economy.

With this booklet before you, the chances are that you'll find Berlin equipment sufficiently interesting to investigate thoroughly its advantage to you.

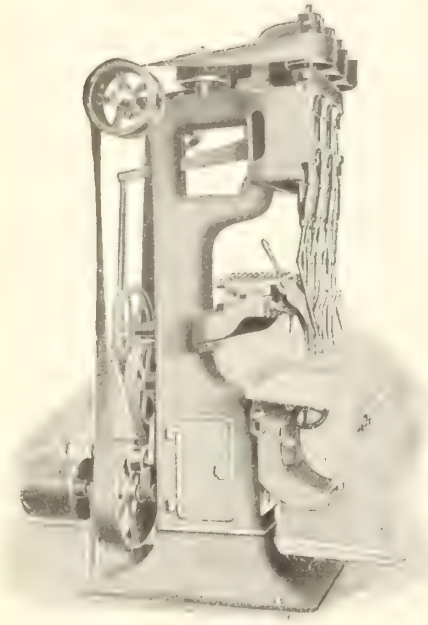
And judging by the experience of users, you'll find your sanding profits increased from the date of installation.

Send for your copy now. It's just as well to get the facts before you, whether you intend to buy your sander now or later.

Berlin Machine Works, Limited
Hamilton, Ontario
Largest Manufacturers of Woodworking Machinery in the World

U.S. Plant, with Offices - - Beloit, Wis.

CHEAPER and BETTER BORING

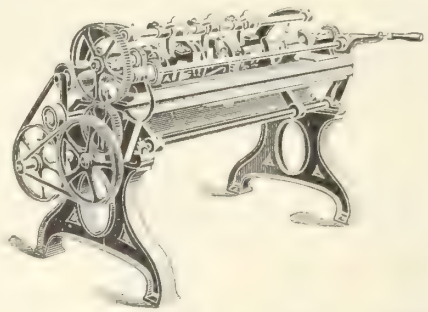


can be done by the use of my Multiple Spindle Boring Machines.

Twelve holes or less are bored at once, in a straight line, parallel lines, staggered, zig-zag, in a circle or almost any position, one inch center to center or 24 ins. apart, any angle up to 35 degrees.

Ask for details.

J. M. NASH, Milwaukee, Wis.



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With an outfit of "OBER"

HANDLE MACHINERY

Work your timber into handles and get the most profit.

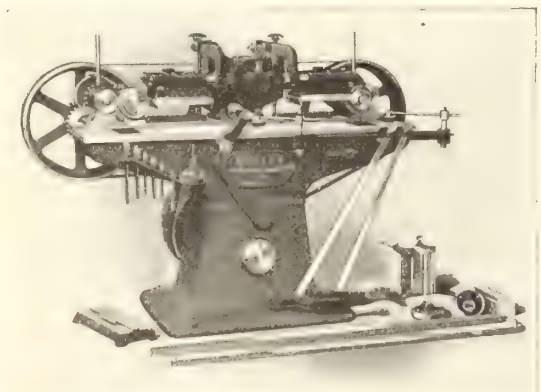
Write for free catalogue No. 31

THE OBER MFG. COMPANY

CHAGRIN FALLS, O., U.S.A.

Duplex Moulding Sander

Irregular Surface Sanding and Polishing Machine



This machine has been invented exclusively for SANDING MOULDINGS with irregular shapes and fine sharp lines at high speed and low cost.

It is the only machine that will preserve the full beauty of the sharp lines. In daily use by

Manufacturers of interior trim, Ship-Builders, Railway Car Builders, Furniture Factories and Musical Instrument makers in this country and abroad.

Our Belt Sanders and Double Edge Sanders are meeting with equal success.

Manufactured by

Duplex Moulding Sander Co.

Hornell, N. Y., U. S. A.

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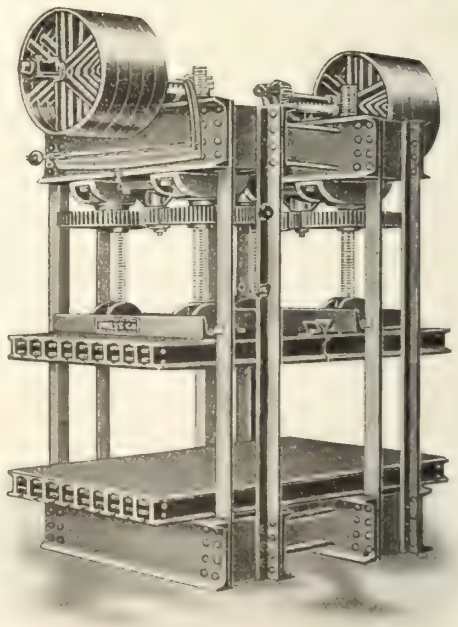

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Trained Mechanics. We know how.

Consult our Expert

INVINCIBLE BLOW PIPE CO.

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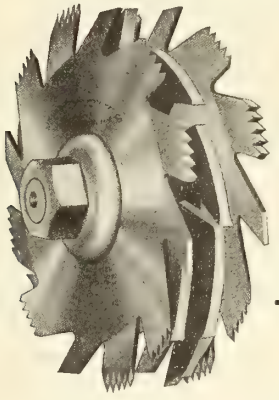

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July 19, 1912

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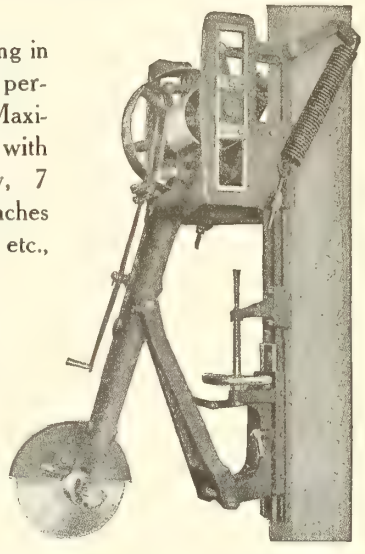

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Good Steel, Carefully Manufactured, Scientifically Tempered

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MILLED SHAPER CUTTERS—Any Size or Any Shape. Ask for quotations.

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The following books are offered at special prices subject to previous sale:

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Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York, 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

The Book of Lumber Shed Construction, by Met. L. Saley. Published by American Lumberman, Chicago. 176 pages, illustrated. Price $1.00.

Popular Mechanics Shop Notes, Published by Popular Mechanics, Chicago. Easy Ways to do Hard Things, etc. Years 1905-1906-1907-1908. Price 40c each.

Cabinet Making, by J. H. Rudd. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

345 Adelaide Street West, Toronto, Ontario

Essay Contest No. 3 (February)

Bi-Monthly Essay Competition

Prizes to the value of Thirty Dollars are offered by the Publishers of the Canadian Woodworker for the

Best Two Essays

on

Subjects of Practical Interest to the Trade

First Prize $20 ***Second Prize $10***

The following must be regarded as the conditions of the competition:

1.—Competitors shall be engaged in some branch of practical woodworking in the Canadian trade.

2.—The subject of the essay shall be at the selection of the competitor, preference being given to topics affording a solution to some practical problem of general interest to the trade or constituting a "short cut."

3.—Drawings (if any) may be sketched roughly, in which case they will be re-drawn at the office of the Canadian Woodworker.

4.—Essays shall be written or typed on one side of the paper only, leaving ample marginal space. No definite limitation shall be placed upon the articles. The suggestion of 1,000 words is given as a guide.

5.—Articles for the February issue competition must reach the Editor not later than February 28.

6.—Awards shall be made on the basis of practical interest rather than literary merit.

7.—The decision of the publishers in the matter of awards shall be final.

8.—The publishers reserve the right to publish the articles submitted.

To the Reader

The value of such competitions as an idea-getter and as a means of promoting the efficiency of the workman cannot be gainsaid. It is reflected in the many helpful, practical articles submitted in the previous contests.

If you held off from the opening contests get in on this one. If you entered but were unsuccessful, **try again,** remembering that the secret of success in every phase of human activity is **trying again.** Practice makes perfect, and the exercise of concentration engendered now will bring results later on. The prizes are worth the winning, but whether you are successful or not you cannot fail to derive some return from the effort expended.

We are all striving for increased efficiency in the trade. If we produce better workmen, we raise the status of the industry. Let us have your co-operation. Exchange ideas. If your ideas are solid they will stand criticism; if not you should know wherein they are defective.

You know your trade well enough? Let the trade know you know it, then. It will help.

Address all communications to THE CANADIAN WOODWORKER, 345 Adelaide Street West, Toronto, marking your envelope in the lower left-hand corner, "Competition."

Chas. F. Luehrmann Hardwood Lumber Co.

148 Carroll Street

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Manufacturers of the original

St. Francis Basin Gum

We have on hand a complete stock of Red Gum and Unselected Gum, in thicknesses from 1″ to 3″. Nice dry stock of 1″ to 2″ Quartered Red Gum.

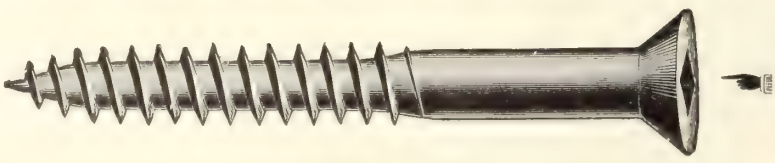
We also carry a complete stock of Oak, Quartered and Plain, Red and White, 1″ to 5″ thick, and large stocks of Ash, soft Maple, soft Elm, Cypress, Yellow Pine and Cottonwood.

We make a specialty of Yellow Pine Structural Timber, and can furnish ither Long Leaf or Short Leaf.

We carry a full and complete stock of all kinds of Veneers, in Red Gum, Mahogany, Oak, Poplar, Yellow Pine and Birch.

ROBERTSON SOCKET HEAD

Wood Screws



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Pat. Feb. 2, 1909

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Drivers sent free with first order. Write for catalogue and prices.

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Canadian Woodworker

A Monthly Publication in the Interest of the Woodworking Industry. Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.

Subscription, $1.00 a year; foreign $1.50.

Woodworker Publishing Company, Limited

Branches: Montreal, Vancouver, Chicago, New York, London, Eng.

345 Adelaide St. West, Toronto
Phone Ade. 2700

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Entered as second class matter July 18th, 1914, at the Post Office at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 15 **February, 1915** **No. 2**

The "Made-in-Canada" Movement

IT is worthy of more than passing mention that a "Made-in-Canada" campaign was launched by the furniture manufacturers at the close of the recent Exhibition in Toronto. A campaign of this kind, established upon the principle of value for value, cannot fail to be productive of good, but it must be established upon that principle only. It is proposed to appeal to 800,000 farmers of the Dominion to buy some article Canadian-made furniture so as to keep our workmen employed and our factories busy. We know not how the truth may be in regard to the figure of 800,000, but if we cut it in half, and then include only 25 per cent. of that proportion of our farmers to place orders running into an average of $10 each, we shall circulate a cool million among the trade. This may be a conservative estimate or not, but the principle obtains; and any movement which has for its end the circulation of money—especially at a time when many ill-advised people are conserving their resources and husbanding their funds almost to a point of penuriousness—finds a champion in the Canadian Woodworker and Furniture Manufacturer.

So far, so good. But, after all, this is the superficial aspect of the question. In point of fact we are not fully persuaded that the sentiment of "Made in Canada" is wholely representative of Canada's best manufacturing interests. Perhaps it would be better to say that, while there is much in theory to commend the sentiment, in practice it is restricted by certain well-defined limitations. We are all good Canadians, and we would all see Canadian goods occupying a position of pre-eminence in this country; but be it observed that such a position can only be attained by virtue of honest achievement—the achievement that is brought about by the policy of placing reputation first and dollars last—not vice versa. We can only expect a demand for "Made-in-Canada" furniture proportionate to the high quality and reasonable price of the various lines of manufacture. One of our correspondents, in writing to us the other day, suggested the use of a "Made-in-Canada" stamp. He wanted to educate the public to the point of looking for a Canadian brand on every article of wood manufacture. Here we have an example of the limitations. It would be all right if the brand were applied only to high-grade articles, but it would be all wrong if it were applied to goods of inferior manufacture, and in consequence both the good and the bad fell into disrepute. There can be no doubt about it that the secret of success in the "Made-in-Canada" movement lies not in tumult and shouting, but in higher standards of manufacture and more extensive advertising.

We had a letter the other day from a good friend of ours, Mr. E. T. Nesbitt, of Quebec, a description of whose plant is an interesting feature of this issue. Mr. Nesbitt is nothing if not an Imperialist, but it seems that he has had trouble lately in putting into practice the theory of **trading within the Empire**—and that is an easier proposition than restricting one's trade to Canada. He tells us that he wanted to put in a certain piece of machinery in his plant, and that he obtained all possible information from Canadian and United States makers. His experience is so harrowing that we quote his letter direct.

"The American machinery seemed far ahead of the Canadian machinery, but then I received a catalogue from England relating to a machine which would do the very work required and at a much lower price. The description of the machine was indifferent, however; the terms employed were not familiar to me, and I could not get a clear meaning of them, so I wrote several letters for more particulars, and received explanations from the English firm. But whether they did not understand me, or I could not understand them, we arrived at no understanding. In the end I gave up in despair, and bought an American machine. I am still ignorant of the merits of the English one."

Mr. Nesbitt goes on to suggest that the only way for the English manufacturer to obtain any success with his machinery in Canada is to come over here and exhibit it, and give the Canadian trade an opportunity to get into direct touch with him, just as the United States makers do.

Mr. Nesbitt's sentiments relate to the development of trade within the Empire, and they have a direct bearing upon the movement looking to the extension of trade in Canada. If the Canadian manufacturer wants to supplant his outside competitor he must make up his mind to get after the trade with a will and to compete in both quality and price. By all means let us build up our industries—especially the wood manufactures, in which Canada may well attain a position of pre-eminence—but do not let us delude ourselves that trade is going to be brought in to us

on the wave of the national and Empire sentiment that has followed this great war.

Like the Prime Minister, we stand first for the Empire against the world, and next for Canada within the Empire. We can say this in all sincerity and true patriotism; but such a policy would not make us so far forget our business training as to pay $1.10 for an article of Canadian manufacture which we could buy for $1 from the United States. We subscribe to Mr. Nesbitt's policy, and we are glad to have the opportunity of commenting upon it. Competition is the life of trade, and the more competition we get from our excellent neighbors to the south the better chance we shall have of feeling a just measure of pride when, if ever, we see an article branded "Made in Canada."

A Modern Woodworking Industry in Old Quebec

(Staff article descriptive of the plant of Mr. E. T. Nesbitt)

IN old Quebec, by way of contrast to the mediaeval appearance of the city and the antiquity of its customs (to say nothing of its streets), there is to be found a progressive industry which bears all the marks of progress and enterprise which the

Mr. E. T. Nesbitt.

Twentieth Century day of the New World has to bestow upon it. We refer to the saw and planing mills owned and operated by Mr. E. T. Nesbitt.

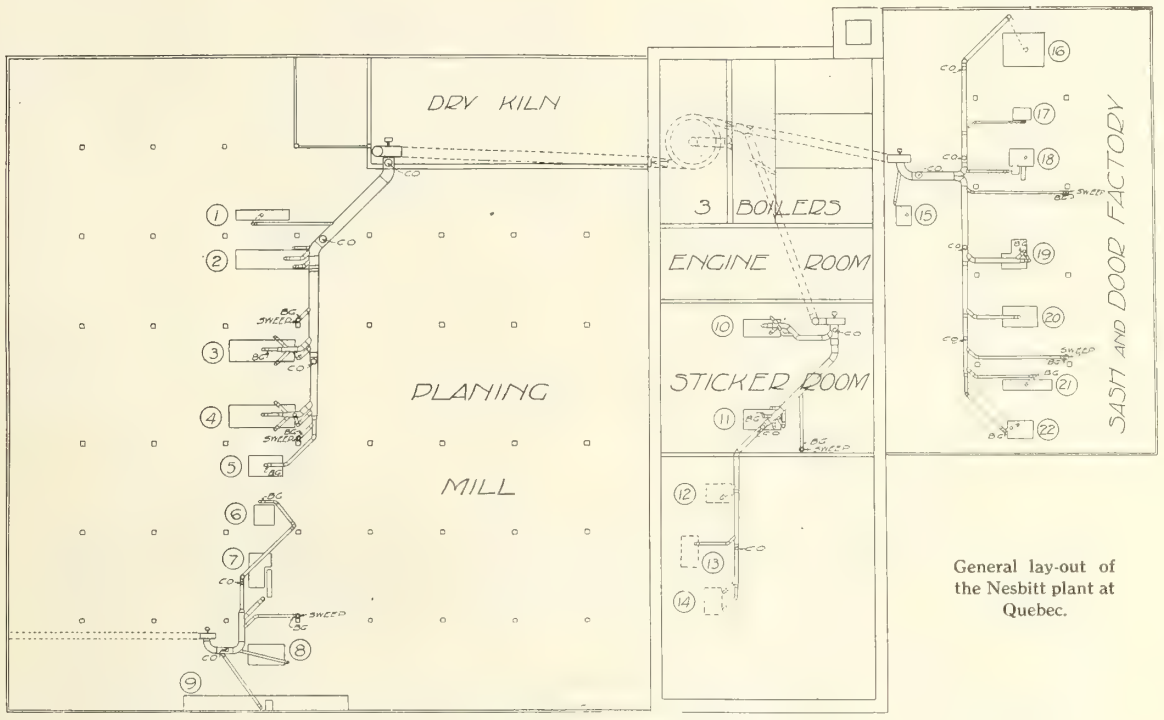
In conformity with the usual practice of the Canadian Woodworker, this article is intended primarily to convey an idea of the factory methods and the type of equipment which have contributed to make the Nesbitt industry famous in the east, but to impart to our type a suggestion of that variety which is the spice of life it may not be amiss to preface the cold facts by a warm personal tribute to the man. In this instance we will come to the man's work a little later.

Mr. E. T. Nesbitt is one of the best known constructional men in Canada—and by the same token he is one of the best liked. Perhaps his most useful work was the founding of the National Association of Builders' Exchanges, of which he was President for three years, and in which, by virtue of his excellent services, he was elected Honorary President for life. Into the work of this Association Mr. Nesbitt threw himself heart and soul, and both workmen and employer owe to him several much needed pieces of legislation in recent years.

Another sphere of Mr. Nesbitt's activity is the Canadian Manufacturers' Association, over whose local destinies at Quebec he has presided as Chairman for the last two years. He is a member of the Council of the Quebec Board of Trade and is Vice-President of a special committee appointed to enquire into the city's system of taxation. He is a good Britisher, as evidence of which mention may be made of the fact that he is a Past-President of the St. George's Society of Quebec.

He has an equal command of both the English and French languages, and we recall occasions upon which, when he has been acting in a presiding capacity at some important function in the old capital he has made an impromptu oration in the one language and followed it immediately with a perfect rendering in

A portion of Mr. Nesbitt's lumber yard, with factory, mill and sheds.



General lay-out of the Nesbitt plant at Quebec.

the other. So much for the man. Now for the plant.

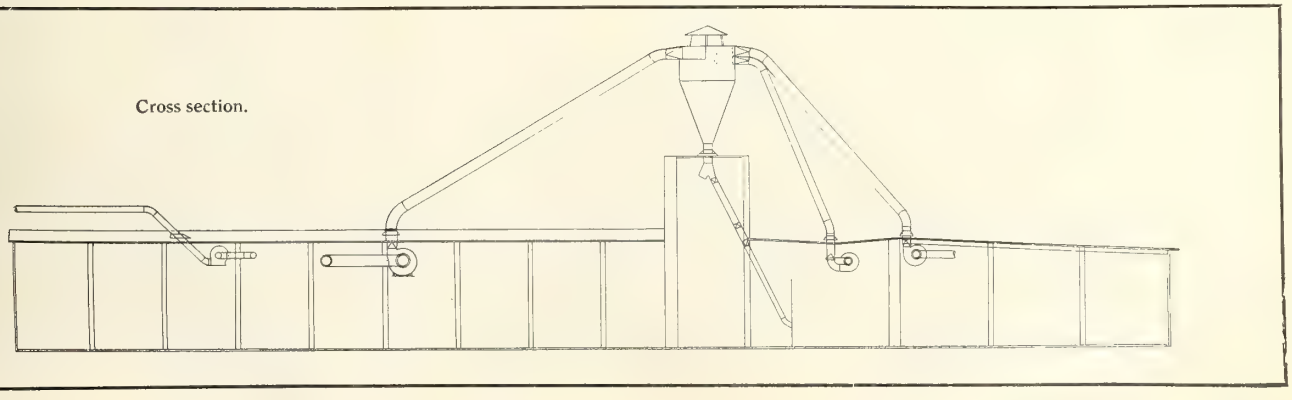
Mr. Nesbitt established his business as long ago as 1884. He commenced in a yard on Queen Street, where he managed to cope with the growing demands made upon him until the early part of last year, when he removed from his old quarters to a new plant on Tenth Avenue, in the Limoilou Ward where he had acquired a fine property annexed recently to the city, adjoining the Canadian Northern Railway yards. Here he had erected a well-equipped modern plant, comprising a saw and planing mill and sash and door factory, a box-making building, a moulding shed, a planing mill, lumber sheds, and fireproof dry kiln. These buildings are equipped with some of the very latest appliances for the economical handling of lumber.

The planing mill is equipped with the following machines:—one 55-in. Berlin Matcher—Berlin Machine Works, Limited, Hamilton; one Q. Y., one lightning flooring machine, one Champion matcher, one 24-in. endless bed planer, one self-feed rip saw, one 36-in. resawing circular,—MacGregor Gourlay Company; one 8-in. band sawing resaw,—Berlin Machine Works, Hamilton.

These machines are installed upon a bed of reinforced concrete, 14 in. thick, 13 feet wide and 80 ft. long. They are securely bolted, this making a perfectly solid foundation and overcoming vibration, giving results impossible to obtain on the ordinary wooden foundation. The large Berlin band saw is also set on a concrete foundation, 5 ft. 6 in. deep, with wells for saw and sawdust waste. To the solidity of this mass of concrete is attributed in a great measure the fact that this machine has given such satisfaction. It has not stopped a single minute for repairs since it was first started, in April last, although logs as large as 40 ft., 16 in. x 16 in., are resawn on it. The travelling crane, with chain pulley, facilitates the handling of timber of any size.

The layout of this part of the mill is unique, as all the above-mentioned machines, eight in number, are installed in a row with ample space between each for free passage of men and trucks. The great saving in space, and economy of shafting and belting are apparent, as one line shaft the length of the row of machines suffices. Chapman Double Ball Bearings are used.

In the sash and door factory the following machines are in use:—one 43-in. Berlin 3-drum sander—Berlin Machine Works; and one 12-in. buzz planer, one iron rip and cross-cut saw bench, one 24-in. endless bed planer, one tenoning machine, one chain mortiser, one



Cross section.

butting saw bench, one spindle shaper, one 36-in. band saw, one mortiser and relisher, one blind slat tenoning machine, one boring machine, one wood-turning lathe, one arm sanding machine, one clamp bench—all by the MacGregor Gourlay Company.

The sticker room is provided with: One 8-in. molding machine (4 sided), one 6-in. molding machine (3 sided), and one iron rip saw table—all by the MacGregor-Gourlay Company.

The box-making building is provided with: One cut-off saw table, one rip saw bench, one planer, one hand hole machine with automatic feed, and one grooving machine with automatic feed.

A complete blower system for the despatch of shavings and sawdust is an interesting and valuable accessory to the plant. This was installed by the Geo. W. Reed Company, of Montreal, and consists of:—One 54-in. exhauster—B. F. Sturtevant Company; one 45-in. exhauster—B. F. Sturtevant Company; one 40-in. exhauster, Sheldons Limited, Galt, Ont.; one 35-in. exhauster—B. F. Sturtevant Company. The necessary piping to each machine conveys the shavings to a 32-in. Cyclone dust collector over a capacious shavings bin 30 ft. x 15 ft. and 40 ft. high, with direct connection to each boiler, so that the fire is fed directly from the planers.

The sawdust, which is not burned but sold in bags is conveyed to a separate building 60 ft. x 20 ft. x 20 ft., some 160 ft.

A spacious room, enclosed in glass, close to the planers, is provided with all power-driven tools for sharpening saws, planer knives, and molding cutters.

The large lumber shed, 200 ft. x 110 ft., in which the planing machinery is installed, also contains the concrete dry kiln, 45 ft. long, 20 ft. deep and 9 ft. high, built of hollow walls and roof, divided into four compartments, with ample piping, and heated with the exhaust steam from the engine and live steam at night. The great advantage of having access to this kiln under cover, and in the immediate vicinity of the planers, amply repays for the space it occupies within the mill.

The engine and boiler rooms are entirely of fireproof construction, which brings the fire risk down to a minimum.

With its mill buildings, lumber sheds, sash and door factory, box-making and office building, sawdust shed, stables and lumber piling grounds, the whole plant covers an area of 200,000 square feet.

Power is furnished by a battery of three boilers and a 200 h.p. engine. To guard against possible breakdowns, an auxiliary engine of 75 h.p., is provided. The element of comfort in winter is afforded by the operation of the Webster system of heating with exhaust steam from the boilers.

A portion of the sash and door factory.

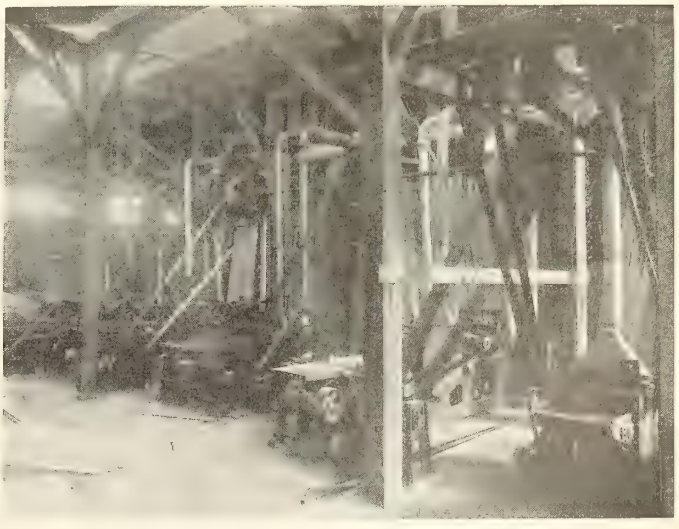
A complete stock of about 3,000,000 feet of lumber is kept on hand, with a reserve of about 4,000,000 feet to draw from the mills situated on the different railroads. The extent of the firm's operations may be judged from the fact that 7,000,000 ft. of lumber, chiefly spruce, is sold in a year. A large proportion of this lumber is manufactured into doors, sashes, frames, interior finish, and mouldings, boxes and matched lumber. The business is also identified with building and

View of the lumber shed, planing mill, and other buildings.

On the left, an alley in the lumber shed: on the right, an alley in the piling grounds. It is of interest to note that the lumber shed is 200 ft. long, that it has two alleys for teams, and railroad track through the centre. Three cars can load or unload at the same time, under shelter.

Mr. E. T. Nesbitt's office in the box-making building.

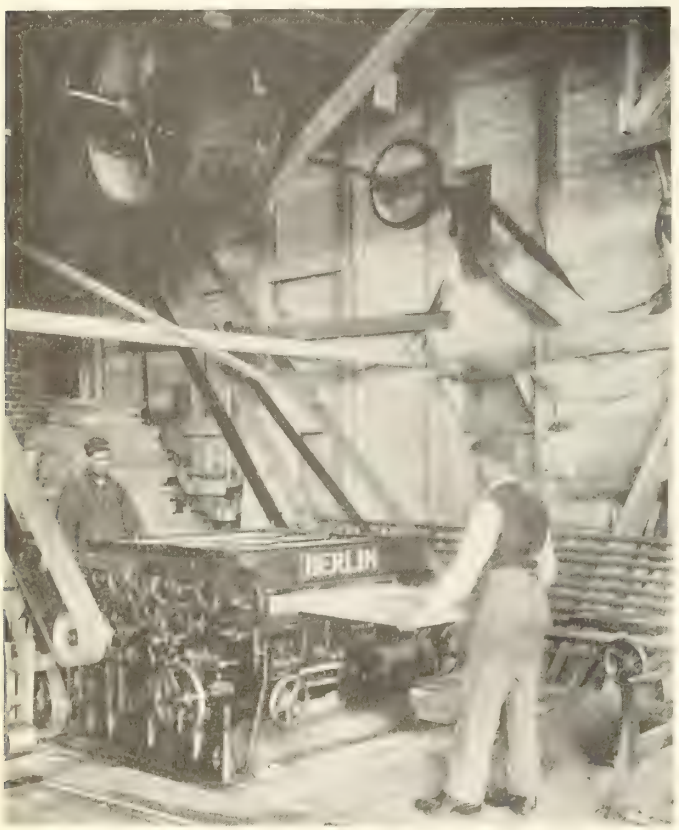
The modern 8 in. Berlin Band Resaw with travelling crane for handling heavy timber.



Planing mill with battery of four matchers and other machines.

contracting, and a large proportion of the output of lumber is being constantly shipped to outlying towns. Shawinigan Falls and Three Rivers and other outlaying towns take large supplies. Owing to the excellent handling facilities an enormous quantity of lumber was supplied to the Valcartier camp last year.

The general layout of the plant affords the most efficient means of handling lumber from the cars to the piles and thence to the mill, the piling grounds, with their siding and two paved alleys, running parallel. The siding runs 100 feet into the centre of the



Sander at work in the factory.

mill, and lumber is handled direct from the cars to the planers.

Large quantities of dressed lumber and mouldings, also doors of all kinds, are carried in stock. Lumber in great variety and in the pink of condition, including spruce, Ottawa pine, cedar, tamarac, oak, maple, birch, ash, native and American basswood, California redwood, B. C. fir, lumber and timber, and dressed flooring and sheathing is kept in well-lighted sheds. A quantity of birch, spruce, pine, and B. C. fir dimension timber is also stocked.

About seventy men, including an office staff of five, and shippers, are employed at the Nesbitt plant. Nine delivery teams are maintained on the road. The building operations of the firm employ additional men, usually by contract, the number varying according to the work on hand.

Experimental shipments of mine props of British Columbia fir are being sent to the collieries of Durham and Yorkshire in Great Britain. The shipments are going by way of the Panama Canal.

Oak stained brown presents a pleasing effect, but why not use walnut and gum to supply the call for brown, and retain oak in its natural beauty?

The Cooperage Trade

By J. Innes

THE year 1914 was unique in the history of the cooperage industry of Canada on account of the serious effect that the war had upon it. The outlook at the beginning of the year was brighter than for many years past. Stocks at the mills were good, both in quantity and quality, and prices were satisfactory to the manufacturers. Large contracts were made by the consumers and there was every prospect of a busy year. Unfortunately, war broke out, and for a while all business was affected, but later the regular trades assumed nearly normal proportions. The scarcity of tonnage for export and the uncertainty of shipments going forward in time to prevent deterioration while in railroad cars, affected the export trade in apples in such an extent that hundreds of thousands of barrels of apples were not barrelled, but were left to rot in the orchards or were converted into cider and dried apples.

This condition affected the cooperage industry adversely, as large stocks of apple barrel material had been accumulated at the mills in anticipation of a heavy demand for apple barrels, and a large percentage of this stock will have to be carried over to 1915. As it costs about 1 per cent. per month to carry this stock, insurance, interest and some depreciation, if the manufacturers are to obtain profitable prices, it will mean higher prices this year for apple barrel material, as the mills are not likely to manufacture much of this stock in 1915 until they dispose of their old stock.

Mills are putting in very light stocks of logs this winter, and only putting in picked timber to make No. 1 stock such as flour, sugar and starch barrel material, and as mills will only run on short time the cost of production will be high, as overhead expenses are much higher proportionately on part than full stocks.

It is doubtful what the year will bring forth, but there is a cheerful optimism prevalent which is bound to have a good effect on business conditions, and we look forward in confidence to at least a moderate year's business.

The lumbermen of British Columbia will ask the Provincial Government for $25,000, and the Dominion Government for a similar amount, to assist them in their campaign to make known throughout the world the advantages of British Columbia timber products. It will be pointed out that the government derives a very large revenue from timber, and only a comparatively small portion comes back to the industry. Moreover, when the lumber industry is brisk, times are good in the province. Figures given previously are that 85 per cent. of the price obtained for lumber goes out for labor and supplies, which means wide distribution.

Owing to interruption of imports of chair cane, there is a splendid opportunity for Canadian manufacturers to make a boom-like addition to chair-seat work and veneered panels to replace the cane and reed work that has been considerably in vogue for some time.

Cherry is the wood most used as a backing for the metal plates from which illustrations are printed in magazines and periodicals. It is chosen above all others because it holds its shape, does not warp or twist, works smoothly and does not split.

Many Interesting Exhibits at the Toronto Furniture Show

THE Second Annual Exhibition, under the auspices of the Canadian Furniture Exhibition Association, was held in Toronto from January 18 to February 1. The facilities afforded the manufacturers for the display of their goods were much more adequate this year than last. The Gregg Building, on York Street, was most appropriate, commodious and comfortable, and being within easy reach of the Union Station, it met the requirements of everyone admirably. The Association is to be congratulated upon the successful outcome of the Exhibition, inasmuch as from the viewpoints alike of business done and furniture exhibited, the highest anticipations of the promoters were surpassed. A noteworthy feature of the year's show was the quantity and quality of Period designs in the various booths. In living-room and dining-room suites, designs after the Jacobean period were much in evidence. Other designs included Sheraton, Mission, Colonial, Adam and Queen Anne, the last-named being represented in a beautiful exhibit of the Andrew Malcolm Furniture Company, and which was admired greatly. Tapestries also are gaining in popular favor, as was evidenced in the fine display made by the F. E. Coombe Furniture Company. As a "Made-In-Canada" Exhibition the furniture shown was in every way creditable to the manufacturers and testimony to the ability of Canadian manufacturers to cater, unaided, to the home market.

The officials as a whole labored with untiring energy for the success of the Exhibition, and the Secretary, Mr. W. J. Craig, of the Hespeler Furniture Company, left nothing undone to promote the best interests of everyone.

Below will be found a brief description of the principal lines shown by the various manufacturers.

Bell Furniture Company, Southampton.—This company exhibited several new lines in Jacobean furniture, both in den and library furniture, library tables, etc. Fumed oak, which is very much in evidence at the present time for dining-room furniture, is, naturally, a strong line with the Bell Furniture Company. Attractive lines in Circassian walnut for bedroom furniture, and Curly birch, in the new finish, were very popular in the show room, largely on account of the decidedly warmer effect than that which is produced by the natural finish. The company carry extensive lines of Period and Mission designs, as well as a handsome miscellaneous production of library furniture and office chairs. The firm was represented by Messrs. H. C. Bell, C. M. Bell, P. Sommerville, E. Roberts, D. McClelland and H. G. Walker.

Lucknow Table Company, Lucknow.—This firm specializes in extension, dressing and kitchen tables. Their exhibit in the show-room, on the 6th floor, was an exceptionally handsome one. Extension tables, in the pedestal and five-leg designs—both of which are very popular, particularly the pedestal design, which is rapidly coming to the front—were on show. The extension tables were in quartered and plain oak, elm, ash, surface oak and birch. The company also manufacture a splendid line of dressing tables in surface oak and elm. The standard finishes are followed, being golden and fumed oak. A satisfactory amount of business was done during the exhibition and the representatives of the firm, Messrs. J. Button, H. Robertson, S. S. Nash, N. H. Hondrich and A. Gowans, were thoroughly optimistic with regard to future prospects for the furniture industry in that progressive part of Ontario.

North American Furniture Company, Owen Sound.—This firm, whose exhibit was co-operated in by the Owen Sound Chair Company and the National Table Company, of Owen Sound, exhibited a very extensive line of high-grade furniture in the leading period styles. A medium grade of bed-room, dining-room, hall and fancy furniture, in mahogany, oak and gum wood, is manufactured by them. The strong feature of the display, in the show-room on the 4th floor, was undoubtedly the Sunroom, which was very attractively arranged in natural order and furnished with a handsome sunroom, or verandah suite, in Belgian grey finish. The design is Colonial with open cane panels, the pieces comprising settee, easy chairs and table, bookcase, writing desk and work table. The feature is entirely new, and one of the company's representatives, Mr. H. B. Smith, stated that it had come in for a great deal of admiration and satisfactory orders had been placed. The general exhibit was a very large one, embracing some very attractive suites in Jacobean, Colonial, Sheraton and Adams designs, in the standard finishes. Mr. Smith is very optimistic regarding the future of the furniture trade and believes that the present is not opportune to raise the cry of hard times and that we shall have to put our shoulders to the wheel if we are to make things go. The other representatives present were Mr. A. N. Kennedy, Mr. J. Weber, Mr. A. Black, Mr. W. H. Pearson and Mr. J. Miuchner.

Meaford Manufacturing Company, Limited, Meaford.—This house features a complete line of house furnishings, white enamel and surface goods, kitchen cabinets and dining-room furniture. The lines, which are carefully chosen, are of cheap and medium-priced furniture, in surface mahogany and surface oak. The range includes dining-room suites, sideboards, buffets, extension tables, dinner wagons, dining-room chairs, bed-room furniture, dressers, stands, chiffoniers, dressing tables, wardrobes, hall furniture, also desks and book-cases, parlor tables, library tables and music cabinets. This company's feature line always has been surface oak and surface mahogany, to which has been added a strong line of white enamel. The representatives in attendance were Messrs. W. C. Wilson, J. T. Montgomery, George Graham, A. N. Kennedy and A. B. Ainsley.

Crown Furniture Company, Limited, Preston.—This firm exhibited handsome designs in bed-room and dining-room furniture in solid mahogany. They manufacture medium and high class case goods, buffets, china cabinets, and with regard to period designs, the Adam style is the popular one at the present time. This firm have been placing on the market recently some handsome designs of a miscellaneous character, including designs in chiffoniers, wardrobes and buffets in fumed oak, golden oak and mahogany. The firm specializes in veneered work and in connection with this important department of furniture manufacture, they pride themselves on two things: the excellent quality of the veneer and the superior finish. The re-

presentatives, Mr. A. Moss and Mr. McGillivery, were highly satisfied with the amount of business done, the number of orders received being much better than last year.

Strathroy Furniture Company, Limited, Strathroy, Ont.—A very extensive line of period goods, comprising Adam, Sheraton, and Colonial styles, was exhibited at this booth. Dining suites in mahogany, golden oak, quarter and plain oak, were featured by the firm, who also displayed a particularly fine line of Jacobean designs. Mr. J. H. Parsons, one of the firm's representatives, informed us that particular attention was paid to the selection of woods for the different designs, this being the explanation of the beautiful figure shown in the exhibit. High-grade and medium dining and library furniture is manufactured by this firm, also a very handsome line in the Mission style. A line of library and office tables, book-cases, etc., was also carried.

Gold Medal Furniture Manufacturing Company, Limited, Toronto.—A large range of upholstered furniture, embracing couches, davenports, divanettes, settees, arm chairs, etc., was shown by this firm, whose specialty is high class upholstered workmanship. Messrs. G. Hughes, W. R. Dalby, and R. J. Byron, represented the firm during the exhibition.

Gilbert Furniture Company, Napanee, Ont.—Although the line displayed by these exhibitors was one of medium-priced furniture still the general appearance of the goods was excellent. Bedroom and dining-room furniture formed the larger portion of the display and the firm also manufacture buffets, china cabinets, dressers and chiffoniers. The finishings most in evidence at their factory are fumed and golden oak, while a novelty has been introduced in the new Belgium grey finish, a novelty that is fast wining popularity. The representatives of the firm in the show-room were Messrs. Geo. W. Gibbon, E. Bagshaw, W. Canning, and B. McBride.

Andrew Malcolm Furniture Company, Limited, Kincardine and Listowel, Ont.—This firm had on exhibit a nice range of dining-room, bed-room, and library furniture in period designs. A noteworthy suite in Queen Anne style, which was a faithful copy of that period, was shown and came in for much admiration and incidentally a number of important orders from visiting buyers. The representatives present were Messrs. Jas. Malcolm, Andrew Malcolm, Jr., Thomas Inglis, and S. J. Davies.

Knechtel Kitchen Cabinet Company, Hanover, Ont.—The lines featured by this firm consist of kitchen cabinets of standard designs, exceptionally well finished in enamel and other finishes.

North American Bent Chair Company, Limited, Owen Sound, Ont.—If perchance there happened to be any in the furniture trade who held the opinion that the Austrian bent chair could not be equalled as the product of the Canadian furniture makers, that suspicion surely was set at rest by the exhibit in the show-room of the North American Bent Chair Company, of Owen Sound. Here were represented chairs covering all prices in oak and hardwood, the lines shown being a faithful representation of the old Austrian chair, which, however, will no longer be imported from an enemy country, but will be manufactured right here in Canada by Canadian manufacturers. Messrs. Jas. Garvey, G. D. Hay, and H. Bovell, represented the exhibitors.

J. C. Mundell & Company, Limited, Elora, Ont.—Displayed living room furniture, Morris chairs and couches, also handcraft furniture. Some very handsome lines in fumed oak and cane panelled furinture were shown. The representatives of the firm were Messrs. J. G. Smith, D. B. Miller, and D. B. Bouey.

Hespeler Furniture Company, Limited, Hespeler, Ont.—This well-known firm of high grade makers had one of the finest displays in the building. Their range of high grade bed-room and dining-room furniture (Period designs) in black walnut, Circassian walnut and mahogany, won the general admiration of visitors to the show room. This year the firm is featuring pretty largely walnut in bedroom and dining-room suites. They are also making Jacobean suites in oak. The walnut pieces are mostly Sheraton and Adam styles. The belief is strengthening amongst important makers that more ornamental decoration, such, for instance, as carving, will soon be a feature of period designs, at least there appears to be a growing tendency towards a greater display of the ornamental. The Hespeler Company had on show a beautiful line in walnut with wide inlay. This line, we were informed, has proved an immense selling line. This is no surprise, seeing that wide inlay provides an agreeable relief from the plain walnut. The firm prides itself in having successfully furnished such well-known palatial buildings in Canada as the Fort Garry Hotel, Winnipeg, the Chateau Laurier, Ottawa, the new Windsor Hotel, Montreal, and the new wing of the Chateau Frontenac, Quebec. The representatives of the firm were Messrs. G. A. Greutzner, W. J. Craig, Percy E. Brown, and P. Zim.

Miscellaneous

Other firms whose exhibits found a prominent place in the shown rooms were F. E. Coombe Furniture Company, Kincardine; Maple Leaf Couch Company, Toronto; Jefferies Furniture Company, Welland; Kindel Bed Company, Limited, Toronto; Lippert Furniture Company, Berlin; Geo. J. Lippert Table Company, Berlin; Malcolm Souter Company, Limited, Hamilton; Elora Furniture Company, Elora; H. E. Furniture Company, Milverton; Shierholtz Furniture Company, Limited, New Hamburg.

Teak owes its value chiefly to its great durability, due to its large content of resin, which fills up the pores and resists the action of water. When fresh it will not float, but when seasoned it floats easily. The oil in the wood prevents its getting waterlogged, and seems also to safeguard it against timber-boring insects. It does not rust iron when worked up with it. In India the chief use of teak lies in ship and house building, especially interior house carpentry, and furniture making. It is also used for carving, the noted carved kyaungs or monasteries of Burma being prominent in almost every village of any importance. Teakwood is rather coarse grained, greasy to the touch, and has an offensive odor, something like that of decaying shoe leather.

It is a good thing to be able to test your glue from time to time and know what you are getting, but it is even a better thing to get a glue supply connection that is dependable enough that you don't need to do any testing.

Virginia uses more woods for boxes and crates than any other state. This record is followed by New York, Illinois, Massachusetts and California, in the order named.

Berlin (Ont.) Upholds its Reputation as a Furniture Centre

THAT Berlin still holds its place as a great centre for the manufacture of furniture in its many branches was amply evidenced by the fine displays shown by the principal factories of that city at the Furniture Exhibition held there from January 11th to 16th. The display, which was held in the old W. G. and R. Building on South Queen Street, was very complete, and occupied the entire second floor of the building. Almost everything in the furniture line, from a sliding shoe to a washing machine, was there. Every manufacturer showed a large proportion of new lines. Improvements in devices in the manufacture of tables, which years ago were unknown, or never thought of, were seen. Particular interest was also centred in the walnut bedsteads and bedroom suites. The new way of treating the wood instead of the old method known half a century ago was a great advance in the treatment of this well-known wood. A visit to the different establishments found all of them optimistic as to the future. Owing to the sales made at the exhibition the depleted stocks of many of the dealers will of necessity soon have to be replaced.

Following is a brief enumertaion of the principal exhibits:

The Berlin Furniture Company.—This firm had an attractive show-room, and exhibited more than two hundred pieces of bedroom furniture. Their lines in mahogany, black walnut, natural and golden oak, attracted much attention. In this exhibit there were also mirrors, writing desks, stands and other articles of furniture in the various styles.

The Hibner Furniture Company.—The several show-rooms of this firm contained interesting examples of library and parlor tables, bedroom tables, dining-room suites in the various styles, book-cases and buffets. The sectional bookcases, in particular, made an excellent display.

The H. Krug Furniture Company.—This firm had a large show-room filled with a variety of chairs, couches, mirrors, tables for library or bedroom, china closets, and a variety of other designs. The Jacobean style figured prominently. Dining-room and parlor furniture, with an assortment of writing desks, were much in evidence. The Mission design, in fumed or Early English finish, and golden oak, was well executed.

The Lippert Furniture Company.—In this exhibit upholstered couches and chairs were a feature. Parlor furniture was also a special line, with a variety of three-piece, four-piece, and five-piece suites. There was a good assortment of dining-room, bedroom, and other chairs.

The Wunder Furniture Company.—This firm, who claim to be the largest manufacturers of hall furniture in Canada, had an excellent display of hall, parlor and dining-room furniture. The predominant articles were in mahogany and quarter-cut oak.

John S. Anthes Furniture Company.—The Adam, Chippendale, Sheraton, Colonial and Jacobean styles were seen to good advantage in this firm's display. The exhibit comprised principally high-grade bedroom and dining-room furniture. A bedroom suite in the Louis XVI style was an attractive item.

Snyder Bros. Upholstering Company.—A variety of upholstered lines made an interesting exhibit. Among the newer designs as a suite in the Jacobean style. The Unifold Davenport, which was exhibited here, showed a number of improvements.

Canada Furniture Manufacturers.—In a visit through this firm's plant one saw the various manufacturing processes from start to finish. The special lines are high-grade bedroom and dining-room furniture, made up in Circassian walnut, American walnut, and mahogany. A noteworthy piece of furniture was a chiffonier made of Circassian walnut, in the Louis XVI. style, with the panels all exquisitely matched. Mention might also be made of the firm's inlaid furniture, and of the various styles of writing desks.

The Globe Furniture Company.—This firm makes special lines of school desks, church and office furniture, which are well known in the trade. Opera chairs and grand stand chairs of special construction were interesting.

The National Furniture Company.—This firm had a representative display of dining-room furniture in fumed and golden oak, mahogany, Early English and Sheraton .

Elmira Interior Hardwood Company.—This firm exhibited a comprehensive line of fire mantles (in oak, birch and mahogany), sectional cabinets, flat desks, revolving chairs, and various office furniture.

The Watson Manufacturing Company.—Kitchen cabinets made in solid oak, and lined with white enamel, were a line worth looking at in this exhibit. The cabinets embodied several new improvements.

G. H. Hachborn Furniture Company.—The motto of this firm might have been "Everything Upholstered." They showed Davenports, couches, easy chairs, Morris chairs, parlor suites, etc., finished in leather made by the Peerless Leather Company of Berlin.

The Woeller-Bolduc Company.—Living-room, library and parlor furniture, made in fumed oak, golden oak, Early English and mahogany, constituted an exhibit well worth looking over. Specially upholstered parlor suites, and some chairs of new design, were interesting.

Baetz Bros.—Dining-room and bedroom chairs, finished in an infinite variety of styles, made an attractive display. The firm showed a large range of cane-seated chairs and Davenports.

Berlin Interior Hardwood Company.—In this exhibit office desks, opera chairs, pews and other seating were shown in a variety of woods. The firm manufactures a complete line of bank and office fixtures.

The Elmira Furniture Company.—A complete line of den furnishings finished in dark oak, and a well-designed drawing-room suite in highly polished mahogany, were the features of this firm's exhibit.

The Lloyd Manufacturing Company.—This firm's display comprised some fifty or sixty carriages, go-carts, sulkies, wooden perambulators, and so on. The

firm make a baby-carriage the entire body of which is built upon a turn-table gear, with a cradle attachment. Their collapsible buggies are an excellent line.

Among those in attendance at the Exhibition we noted the following:—L. Joltes, Toronto; J. Kone, Toronto; E. F. Best, Simcoe; G. R. Quirmbach, Brockville; John Sloan, Nome, Alaska; W. Walker, Clinton; Geo. H. Honsberger, Toronto; Alf. Irwin, Toronto; E. W. Williams & Son, Burlington; Finlayson, Paris; N. H. Letter, Waterloo; J. S. Ruppel, Waterloo; F. Schmidt, Waterloo; H. Simpson, Hamilton; J. H. Jackson, Georgetown ;C. Brown, Berlin; A. E. Everett, St. John, N.B.; J. D. Lamgan, Halifax, N.S.; E. L. Ziegler, Winnipeg, Man.; F. J. Pond, Toronto; A. Edwards, Elmira; A. E. Schwalm, Preston; D. E. Turner, Berlin; Ed. Lippert, Berlin; Wm. Anderson, Toronto; Mr. Weber, London; Alb. E. Wolf, Waterloo; James Acton, Furniture Journal, Toronto; Alex. Peppler, Hanover; J. H. Laughton, London; Julius Knauff, Waterloo; G. Lippert, Berlin; H. A. Lippert, Berlin; N. Arnold, Elmira; A. Steinke, Elmira; Adolph Steinke, Elmira; A. H. Dantzer, Waterloo; E. A. Poth, New Dundee; W. L. Lundy, Hamilton; N. J. Boyd, Mitchell; H. Evel, Hamilton; J. Thompson, Wiarton; C. Dreisinger, Elmira; A. M. Berlett, Linwood; H. Kastner, Stratford; F. Fischer, Elora; Joe Rheinhardt, Clinton; L. N. Phippen, Sarnia; Otto Theiss, Toronto; Frank Goodwin, St. Thomas; W. Wrigley, Toronto World; W. A. Coltart, Chatham; W. J. Dore, Hamilton; K. Green, Hamilton; W. B. Emey, Oakville; H. M. Snyder, Waterloo; D. E. Statters, Lucknow; M. Kelly, Brampton; McIntyre, Brampton; J. Stager, Hespeler; A. W. Purtle, Toronto; F. Boland, Montreal; A. W. Barlett, Toronto; Martin Anthes, Montreal; Stumpf & Marchand, Stratford; W. J. Walker, Seaforth; Geo. Jeng, Elmira; W. E. Long, Brantford, D. A. Sauter, Hamilton; James Davidson, Hamilton; R. W. MacDonald, St. Thomas; Jackson & Son, Leamington; R. Cornyell, Toronto; W. L. Jennings, Fredricton, N.B.; Robt. Johnston, Hamilton; J. Hoodless & Son, Hamilton; W. Nash, Hamilton; J. H. Brett, Dunnville; J. Little, Galt; Allan & Ray, Galt; N. Keen, London; A. Keen, London; Adams Furn. Co., Toronto; Geo. Sauter, Regina; W. P. Patton, London; Thos. Pursell, Brantford; M. E. Glasglow, Hamilton; Lapplan, Montreal; Veal Bros., St. Catharines; J. I. Parsons, Sarnia.

The manufacturers of musical instruments in the United States report the use of 41 woods to the amount of 260,000,000 ft. a year. Following are the musical instrument woods of the United States, arranged in the order of importance, from those demanded in largest amount to the least: Maple, yellow poplar, chestnut, spruce, oak, elm, birch, basswood, white pine, red gum, mahogany, black walnut, beech, ash, cottonwood, yellow pine, sugar pine, hemlock, Douglas fir, tupelo, cherry, sycamore, redwood, Circassian walnut, balsam, fir, butternut, West Indies boxwood, cypress, ebony, rosewood, cedar, Spanish cedar, buckeye, satin-wood, prima vera holly, eucalyptus, camphorwood, tulip wood, hickory, Turkish boxwood.

Be sure that the surface to be varnished is free from dust or dirt, grease or moisture, or marks of any kind, or otherwise you may have a blotched finish.

Varnish requires light and air to dry right. It will dry more in one hour of daylight than in two of darkness.

Band Saw Guides

By J. F. Palmer.

IT will pay mill men to keep a sharp eye on the band saw guides and see that they are kept in first-class shape. The guide is such an important part of a band saw that good work is impossible without one which holds the saw just right.

The first thing to do is to see that the wheels and tires are in working condition. Tires and wheels are not guides, but just mark it down that the best set of guides ever put on a band saw will go bad unless the wheels and tires are in good working condition. Therefore, begin to set the guides by looking after the wheels and tires.

When the saw will run well and track properly, then, and not till then, should you look after the guides. If it be a wheel guide above the table, see that the wheel is smooth and free from cuts made by the back of the saw. Frequently we find guide wheels badly marked and cut by the saw running against the guides while the wheel is stuck fast and unable to rotate. When a guide wheel is in this condition, have it ground before you try to use it. Grind the wheel yourself if you can rig up for it, but have it ground, even if you have to send it away to have the work done.

If it be a ball-bearing guide, see that the balls are all in good shape and none of them flat or worn smaller than normal diameter. Look also to the ball race, then to the pin or post which supports the guide wheel. Any appreciable lateral motion or play in this part will spoil the efficiency of the guide. See that the guide is so set that the saw does not bear against it when cutting. I have seen saws set so far back, or guides so far forward, that the saw had a decided bend in it where it passed the guide. This is all wrong, and can only lead to the destruction of the saw blade and the guide wheel. The constant bending will crack the saw, and, sooner or later, the saw will seize the wheel and wear slots in its surface, after which that guide wheel is useless until it has been reground.

There is no need of the saw bearing against the guide wheel while not cutting, and it should bear very lightly, if indeed at all, while the saw is cutting. There are many double-toother band saws in use, in which the saw cannot touch any back guide wheel, for there isn't any. These saws are made to stand up to their work by the proper tension of the blades, the condition of the wheels and tires, and the shape of the saw teeth. The same thing can be done with the small saws used in the woodworking shop, and it is wrong practice which permits a saw to bear against the guide wheel when not cutting. Remember that the office of the upper guide (and the lower one as well) is to stiffen the saw sidewise, not to form a bearing to carry the thrust of the saw when cutting. Once get this point well fixed and you will have better results from band saw guides.

When wooden or metal sliding guides are used, the same remarks apply. The one great point is to see that the fit of the guides on either side of saw is such as to keep saw squarely in line with the face of each wheel, and that there is very little play between saw and side guides. See also that the back guide barely touches the saw when the latter is not cutting, and that the side bearing strips, either of wood or metal, are square and well fitted against the saw. And then—go ahead and do a whole lot of work on that saw. If it is filed right, you can do so, with the guides and wheels in the condition herein described.—The Woodworker.

What is the Chippendale Style? A Study of this Great Cabinet-Maker

By James Thomson, in the Craftsman

WHAT is the Chippendale style? Most assuredly not that which a great many people who talk about it take it to be. For with a perversity as singular as it is unaccountable, a good many cultivated people have come to attach the name of Chippendale to pretty much everything in the way of furniture handed along to us from Colonial times. They, in thus doing, not only work injustice to the memory of a number of talented eighteenth century English designers, but totally ignore the fact that there are many Colonial pieces that date a century or more farther back than the period in which Chippendale worked. Where the first settlers brought domestic furniture with them, it was of the Stuart period, such as we of today call Jacobean. While to the influence of the English eighteenth century furniture designers the charm of Colonial woodwork is undoubtedly due, Chippendale was the responsible agent for but a part.

Our Western furniture manufacturers, in today exploiting the period styles, undoubtedly are teaching the masses to more or less correctly differentiate the historic characteristics. Up to a time quite recent, Sheraton chairs, like that shown in Fig. 12, were almost invariably spoken of as Chippendale, both by the trade and public. The state of affairs at present is virtually as follows: Real Colonial furniture of the days of Winthrop and Washington is called Chippendale, the designation Colonial being reserved for the clumsy sham classic emanations sometimes dubbed "Empire," which did not, in any case, have inception before 1810. The whole misapprehension, doubtless, in the first place, was due to the ignorance of dealers in the antique, who could not properly differentiate. They started on the wrong track, and it now is difficult to right matters.

For a great many years, the cabinetwork of Puritan times was generally unappreciated. Artists at no time

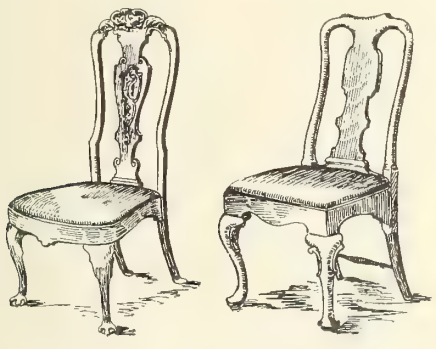


Fig. 1. QUEEN ANNE.

lost taste for the old, but outside of the profession, it was reserved for but a few people of art impulse to see the good of the old in the presence of the new. To many of a newer generation, the fine old Hepplewhite sideboard or Sheraton bureau was anathema. In many a household of old New England stock when the aged had passed to their reward, and the young had full sway, fine old mahogany was hustled to the garret to make room for black walnut atrocities. Where a genuine Sheraton bureau was spared, it was at the expense of being shorn of its harmoniously beautiful handles of brass, while clumsy vine-leaf wooden pulls were substituted.

When, after some seven hundred and fifty years of effort, the Moors were finally driven out of Granada, the conquerors whitewashed the beautifully decorated interior walls of the Alhambra. Time passed, and new generations came on the scene, knowing nothing of the beauties of coloring there concealed. Artists knew, because they could stake their lives on the

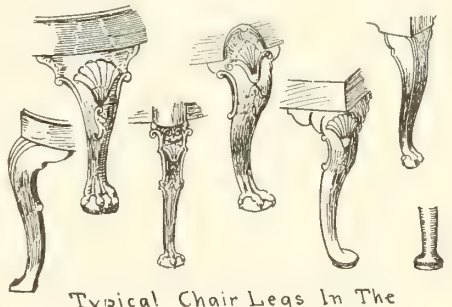


Fig. 2. Typical Chair Legs In The Queen Anne Style

fact that the Moors never could be satisfied with mere white as a mural decoration. In due time the whitewash was removed, and then was revealed the most beautiful decoration in red, blue, green and gold it has been the lot of human eye to behold. Much the same was it in New England in the middle of the nineteenth century. Public taste was at low ebb. Such taste as the first settlers had became a thing non-existent in their descendants, because the latter had entirely lost touch with Europe. People, as they gained in wealth, were attracted to the showy and meretricious. Fine old furniture was disposed of when possible. When not possible, it was stored in attic or outhouse. Kicked from pillar to post, neglected in every way, its condition in process of time, of necessity, degenerating. Another generation despised it to a still greater degree than did the preceding one. At this juncture, a tin pedler has been known to gain a good mahogany bureau or table in exchange for a pot or pan.

A sideboard reposed in the hen-house of an old farm for unnumbered years. In the eighties of the last century, when a revival of taste for old Colonial things began, a wealthy citizen of Boston had the article taken to the shop of a cabinet-maker, to the end that it might be put in order. Generations of hens had brooded in its closets. It was in the worst possible condition, but no parts were missing. Once the surface had been scraped, the front was found to be beautifully inlaid with rare and costly woods. The centre was straight, while the end sections were concave, which put it in the Hepplewhite class. The body was mahogany of real San Domingo quality. The brasses unfortunately were missing. Fifty dollars put it in good order. In the end, the well-known Boston merchant, the gentleman referred to, had as beautiful an example after the Hepplewhite manner as one could wish for.

The sideboard, doubtless, in the first place had been sent to the barn. Having a wax finish, dirt, in

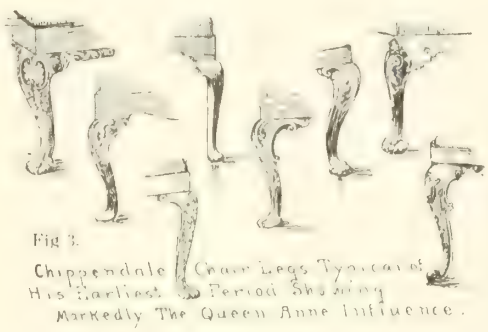
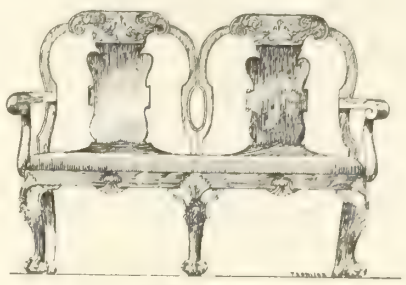
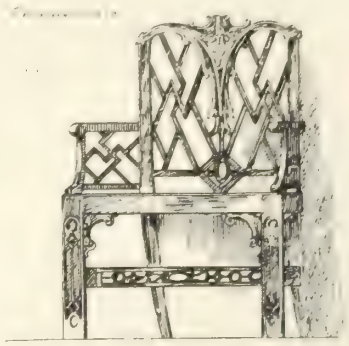


Fig 3.
Chippendale Chair Legs Typical of His Earliest Period Showing Markedly The Queen Anne Influence.



QUEEN ANNE Fig. 4.



process of time, accumulated on the surface to such an extent as to obscure the marquetry. A new generation, having never known it in any other condition than it was, thought it a very useful article for the hen-house. In the hen-house, of course, it rapidly deteriorated, and there you are. Thus does the shrewd collector sometimes pick up a valuable specimen for a trifle. In a certain Boston shop, dealing in antiquities, the lady proprietor shows a Chippendale sofa which she values at a thousand dollars. If it cost her more than five, I should be surprised. She values it so highly because of its rarity, claiming there is but one like it, and that in the Pendleton collection.

Thomas Chippendale published the "Gentleman's and Cabinet-makers' Directory" in 1754. Its influence doubtless was soon perceptible in the American Colony. Rich Southern planters and merchants of the East were wont to buy furniture in London. There is thus a possibility that some Chippendale chairs that have stood the ravages of time may have been made by Chippendale. It is more likely, however, that the bulk of the chairs of this type were made by Colonial craftsmen from designs culled from Chippendale's book. Further along, I explain more fully how Colonial craftsmen as the makers can be detected.

As William-and-Mary and Queen Anne influences were dominant when Chippendale was enacting the part of the industrious apprentice, a strong Hollandish appearance characterizes many of his best pieces. It is indeed difficult to dissociate some of his early sofas and chairs from the real Queen Anne. He employed the same box seat, the cabriole leg, and in the case of some of his sofas, the one thing to separate them from the Queen Anne classification is a Rococo shell ornament in the centre of the moulding running around the back upholstery.

William and Mary, 1689 to 1702, took with them, from the land of dams and dykes, a shipload of pot-bellied chinaware, bandy-legged chairs and highboys. Dutch house furnishings became the rage in England, even architecture showing the influence of the Netherlands. A mixture of classical detail, and "go as you please" Dutch and Flemish ornament, masqueraded under the appellation of "Free Classic." Of examples in this country, the Old State House in Boston, and Independence Hall, Philadelphia, may be cited.

The exuberant fancies of the Louis Quinze style in France could not but have influenced English cabinet-work. Chippendale could not well escape, hence many of his designs may be considered purely Parisian.

In Fig. 3, a characteristic Dutch chair is shown on the right, that on the left being a notable example of the Queen Anne period. Chairs after the manner of the Dutch example are plentiful in England, and I doubt not there are many in America.

Fig. 4 shows a fine William-and-Mary seat not unlikely of English make with which the Chippendale one delineated in Fig. 5 may be interestingly compared. Here is shown the Queen Anne influence without any Louis XV. entanglements. Nothing can be more graceful than the interlacing of the back. Notice the slight S-curve of the back legs. A less artistic designer would have been satisfied to omit this feature. This subtlety of line like the entasis of a Greek column would be lost on aught but those sensitive to slight differences in form. The cabriole leg is employed here, but usually the plain straight block leg is to be found with this style of back.

Fig. 6 shows three excellent examples of what may

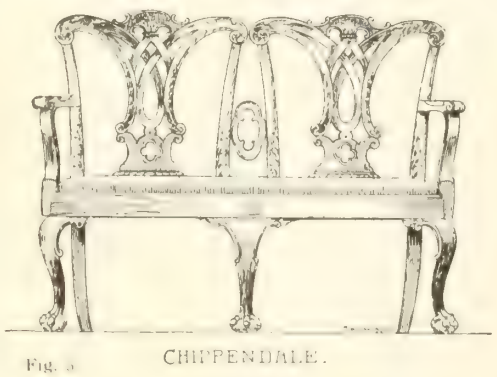


Fig. 5 CHIPPENDALE.

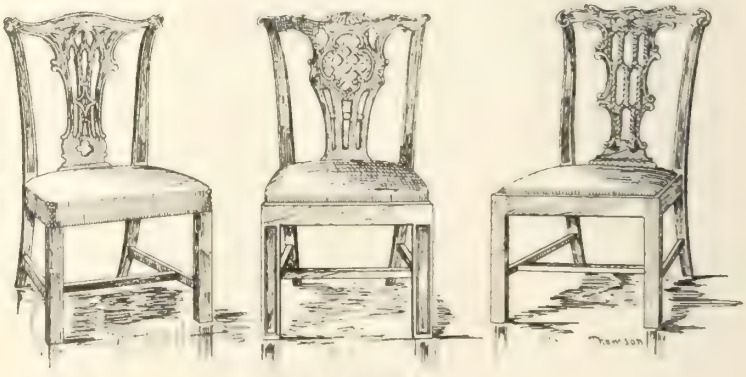


Fig. 6. CHIPPENDALE.

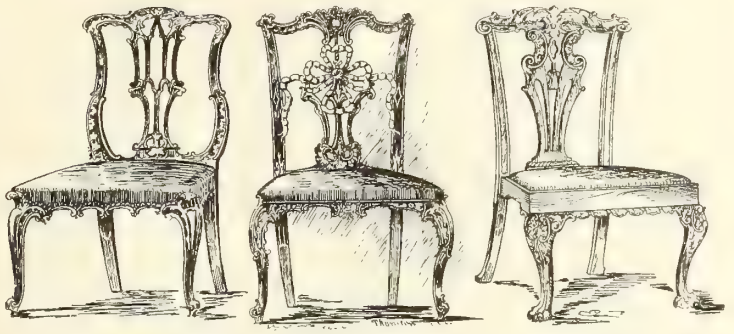


Fig. 7.

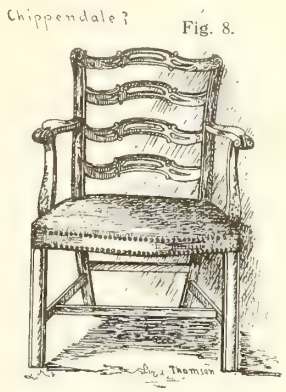


Fig. 8.

be termed Chippendale's middle period. Struck with the interplay of curved line in the windows of a Gothic church, he many times succeeded in giving semblance to it in chair-backs. He was sensible enough not to attempt the ecclesiastication of general outlines. He was satisfied to fill in the back with tracery after ideas gleaned from the cathedral window. In these chairs, he breaks away from the cabriole leg, and contents himself with plain blocks. It seems a far cry from the elaborate back to the plain block leg, and not many designers would have dared to make the venture. Chippendale succeeded where doubtless others might have failed.

Fig. 7 exhibits three notable specimens in the designer's most ornate manner. He, for his purposes, here draws upon the French, but it is French with a difference. These chairs were carved only for those with well-filled coffers.

Fig. 8 shows a design in regard to which authenticity has been questioned, for what reason I know not, other than the fact of departure from the usual Chippendale manner. We do not find him using the cross splat in published designs. If Chippendale did not design the chair, some individual of equal capacity was responsible. Here we have his free flowing treatment of lines.

Chairs with the horizontal splat were common in Holland. They reached England by medium of William and Mary. We had them in Colonial times here, and many in pretty shaky condition are today scattered through the farmhouses of New England. Pinned at the joints, though rickety enough, it is difficult to pull them apart.

Chippendale, at one period, took to Chinese ideas. He was much more successful in adaptation of these than Sir William Chambers, the original innovator. His combination of Chinese, with the style of the Regency and Rococo, is charming, albeit most expensive. The rage for blue chinaware was then in the ascendent. Cabinets and hanging shelves, to house such collections, were in demand, and Chippendale in his delightful pagoda-like creations more successfully met the demand than did any of his compeers. It is doubtful if any appreciable quantity of the master's Chinese-Louis-Quinze creations in Colonial times found lodgment in the young Colony unless it were in the South.

In Fig. 10 is shown a portion of a sofa that is decidedly French. It is, however, French with a difference, and the difference is involved in Chippendale individuality. It is Louis XV. seen through Chippendale temperament. He designed a great variety of articles in this graceful style, all touched with the exuberant fancy of the Parisian designers of the day. It would require very elaborate Georgian-Queen Anne environment to make harmonious place for such an article.

The William-and-Mary and Queen Anne chair-backs in Fig. 10 are submitted simply to show the source of some of the Chippendale embellishment in the shape of carving. The radiating design on the back of the scallop shell was a favorite decorative feature in Queen Anne cabinet-work. The acanthus leaf twisted or otherwise is quite common. The carving examples here submitted are from characteristic pieces. On such ornamentation, there is much of the irregularity, abandon and freedom to be found in Rococo, but with a difference. Examination of Hogarth's

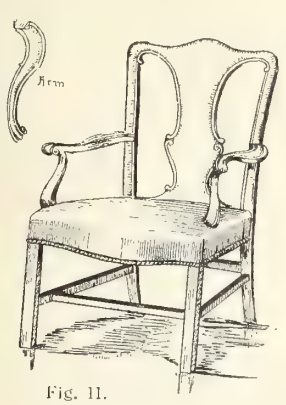
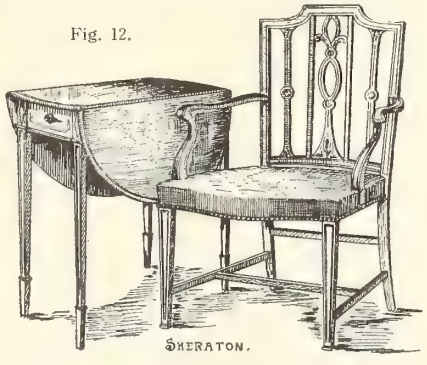


Fig. 11.

Fig. 12.



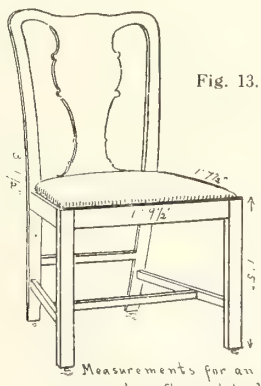


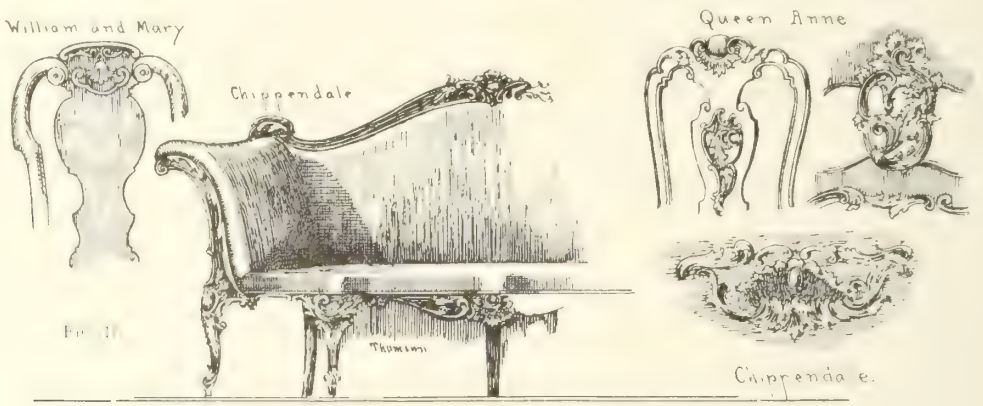
Fig. 13.

plates, and a study of chairs (especially as affecting backs), such as are shown in Figs. 5, 6 and 7, will disclose the source of a great deal of Chippendale inspiration. Given as generous a wealth of material upon which to draw, Hollandish, Flemish, French and Chinese, it required but the touch of adaptable genius, which he had in more than customary measure, in order to work the wonder. Out of a ruck of mediocre performance, the product of Chippendale looms large. To evolve a style that has so well stood the test of years, a style that today appeals to cultivated taste, is distinction sufficient.

Chippendale undoubtedly employed the claw foot though it is a bit singular he does not exploit in his book of 1754. His book was published in the last named year, but in my possession are plates dated 1760.

He does not, in any published design, show a chair in which is used the cabriole leg that utilizes the stretcher. To my way of thinking, all such chairs today to be found were made by American craftsmen. In the designer's published work, the manner of stretcher employed is such as are shown in Figs. 6, 8 and 9, and never otherwise, at least so far as in my researches I have been able to discover.

All designs herein submitted are from English sources. The chairs and seats are in the master's best



manner, and are such as have become, in process of time, generally associated with his name. Such chairs were expensive to build. Carved and rounded with the loving care of the true craftsman who is not pressed for time, in every way they fulfil requirements. Always was the back carved by rounding so that no flat surface showed at the sides of the rear legs. The back curves gradually rearward starting perpendicular at the seat. The face of the back was carefully carved in low relief, all sharp corners being softened. Such chairs were very comfortable, because the convexity of the face of the backs accorded with human requirements.

There is one merit in these characteristic Chippendale chairs that should be touched on. We may simplify the design by omitting all carving and still leave a pleasing result. One may even omit the perforation of the back, and the result be surprisingly effective. Many Colonial chairs based on Chippendale lines are thus to be found. In Fig. 11 is shown such a chair, English in origin.

As the chippendale chair was larger than common, I, in Fig. 13, submit measurements of one taken from his book. This represents a box seat, the upholstering being nailed to a separate frame which drops into the box, the bottom resting on a ledge. From the ground to the top of the box should be 16 ins. to 17 ins.. 18 ins. is the customary height from floor to stretched edge of upholstering. Chippendale never used castors.

In Fig. 12 is shown the class of chair so many people take to be Chippendale. In the case of Sheraton and Hepplewhite, it is often difficult to differentiate, but Chippendale is so entirely different, no mistake is possible save such as is involved by confusing his work with imitating compeers. At least half-a-dozen makers were turning out articles after the Chippendale manner, Robert Manwaring, Ince and Mayhew, Lock and Copeland, to mention the chief of them. Chippendale always used carving and fretwork as ornament, never inlay or painting. Queen Anne, Louis Quatorze, Chinese and Louis Quinze styles form the quarry in which he dug.

"He scarcely used mahogany." is the assertion of one writer, as regards the Chippendale practice. Says R. Davis Benn, in his interesting work on English furniture from the time of Queen Anne on, "I need hardly explain that Chippendale was among the first in this country (England) to employ, for the manufacture of furniture, Spanish mahogany of the finest figure and color procurable. In the course of time, the wood by natural process deepened in color and attained a beautiful richness of tone."

This sounds more reasonable, for as mahogany was much used in the time of Anne, it is not at all probable Chippendale, at a later period would be so foolish as to refuse to avail himself of it. In fact, he used it extensively—otherwise whence come the many notable examples in this wood that may be traced to him, at present to be found on the other side of the Atlantic?

What was known as "Spanish mahogany in England was, in the United States, called "San Domingo." The best of the wood was long ago cut, and not for a great many years have our dealers looked to that source for a supply. It was a wood rich in color, close in grain, of excellent figure, and heavy in weight, as even a small mahogany table of Colonial times will testify.

The question of how to utilize short lengths most profitably is being solved by the Arkansas Soft Pine Bureau, which has devised a new design for porch ceilings that is having a big sale. The ceiling is made entirely of short length material by blocking the plain surface into panels, and by also using short lengths for the cross beams and the mouldings. The appearance is said to be very attractive.

For the motor-driven line or countershafting 900 revolutions seems to be a favorite speed. This permits the use of light shafting and small pulleys.

Grain of Wood and its Meaning

NO man has ever yet succeeded in defining "grain," as applied to wood, in a way satisfactory to all interested parties. People do not understand it in the same way, comments the Hardwood Record. Various viewpoints are held by different users of the term. One man's definition will not fit another's. When a man talks of the grain of wood, it is necessary to know in what way he handles wood before his exact meaning can be known.

The general idea is that grain means the annual rings of growth. Undoubtedly that is the basic idea with most people, but it lacks much of being an exact definition, because "straight-grain," "cross-grain," "smooth-grain" have little meaning if applied to the growth rings. Such rings never cross, are never straight, and smoothness cannot be applied to them in a strict sense.

The term grain in reference to wood is elusive. It is difficult to pin it down to an exact meaning. Experienced judges cannot agree among themselves. When a handle maker speaks of a smooth-grained wood he means one that feels smooth when rubbed with the hand, no matter whether the growth rings are wide and distinct, as in hickory, or narrow and vague, as in boxwood. A pattern maker wants a wood which cuts easily in all directions, like white pine. It makes no difference to him what the rings look like, or whether the wood has any. Yet he calls it "homogenous grain."

The furniture maker's idea of grain goes further than that of the handle maker or pattern cutter. He takes into account the wood's appearance when it is cut in either longitudinal or radial section, or oblique to the radius. He frequently associates the medullary rays, or bright patches in woods like oak, with grain. That is apt to be what he means by the word; yet, these rays have nothing to do with the size of annual rings. They cross these rings at right angles.

One man will look at the end of a chestnut log and say the wood is coarse-grained, and at the end of a red cedar log and pronounce it fine grained. In this case he refers to the width of the growth rings, those of chestsut being wide, while cedars are narrow. Mahogany usually has no rings that anyone can readily see, yet it is perfectly proper to speak of its grain.

It is evident that the term is loosely used and means different things, depending upon who is using it. Wood technologists are more exact in their definitions, at least those of the United States Forest Service, who insist that "grain manifestly should not refer to the rings of annual growth," though it is fundamentally influenced by the bonds of spring and summer wood which make up the rings, and also by the medullary rays.

According to this definition, a wood's grain should be considered as the arrangement of its fibres, pores, and other elements of which the wood is composed. The fibres usually run up and down the trunk. They are the wood cells or strings of cells. When separated one from another they look like minute splinters, the longest of them seldom exceeding a quarter of an inch in length. The pores of hardwoods are tubes which also run lengthwise of the trunk, among the fibres. In some woods, as oak, chestnut and hickory, the pores are readily visible to the naked eye. In other words, like cottonwood, yellow poplar, and red gum, the pores, though very numerous, are generally invisible without a magnifying glass.

If the pores are small or wholly wanting, and the fibres are small and compact, the wood is classed as fine grained by technologists, and as coarse grained if the fibres are large and the pores large and numerous. When this view is taken, such terms as "cross-grained," "spiral-grained," and "straight-grained" have a meaning, which they do not have if the yearly rings are taken as the basis of grain. Black gum is cross-grained because its fibres and other elements cross one another; it is fine grained because its pores are small and its fibres compact. Some chestnut is straight-grained because the elements are parallel to the axis of the trunk; others are spiral-grained because the elements run round like a winding stair. The term "woolly-grained" is sometimes applied to wood—usually to mahogany—by the finisher. It refers to a surface which fuzzes up when attempt is made to polish it. Such wood is really cross-grained, and the ends of the oblique fibres are torn loose by the polishing tool, but are not cut smoothly off.

It is evident that when a wood's grain is spoken of it may refer to characters quite different in their nature.

How Mahogany Came Into Use

LIKE the use of a great many of the factors connected with the arts and sciences, the discovery of the beauty of the grain of mahogany was purely accidental. The story goes that a certain West Indian captain had brought back to England some planks of mahogany as ballast, decided to give the wood to his brother, a Dr. Gibbons, then building a house in King Street, Covent Garden. But the planks were so hard that the carpenters objected and the plan fell through. Some time later, Mrs. Gibbons wanted a small box made and the doctor sent the mahogany to a cabinet-maker. In his turn the cabinet-maker objected to the hardness of the wood, but the doctor persisted so much in his request that the order was finally executed. The finished box polished so nicely that the doctor order a bureau made of the same wood. The cabinet-maker displayed that in his shop window before delivering it. The Duchess of Buckingham saw it and begged enough wood from the doctor to have it duplicated.—Southern Furniture Journal.

Circular saws of paper are being increasingly used in England for the cutting of thin plates of wood. Veneers made in this way are so smooth that cabinet-makers can use them without further planing.

A suggested new use for a woodworking factory comes from Sackville, N.B., where it is proposed to turn an old woodworking plant into a concentration camp for the detention of alien enemies.

Some idea of the importance of glue to the veneering industry may be had from a consideration of the fact that if it wasn't for glue there wouldn't be any veneer industry.

One authority says that the growing in favor of the Jacobean idea in furniture is giving an opportunity for oak. The favorite finish seems to be gray-brown and fumed.

During the year 1914 Canada's trade in forest products amounted in value to $41,871,383 as compared with $42,532,673 during 1913 and $43,586,853 during 1912.

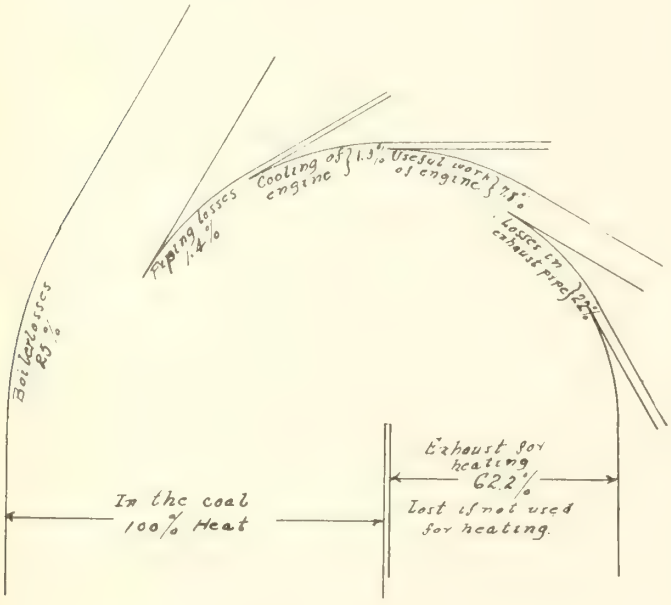
QUESTION BOX

A Practical Department of Reference for the Practical Man

Heating Dry Kiln by Exhaust Steam

Q.—"It has been suggested that we can heat our dry kiln more economically by exhaust steam than by live steam, but there is a question in our minds as to whether or not we would be able to get sufficient heat, and if so how it would affect our engine. The kilns are of the usual progressive type, 80 ft. long, a battery of two making up our equipment at present, each heated by double coils of 1-in. pipe, each section containing 18 pipes. The kilns are about forty feet from the engine, which is a high speed machine rated at about 100 h.p., and developing about 75 h.p. We would be glad to have some information regarding this proposed change, if you can put us in touch with some experienced person."

A.—You cannot well lose in a proposition of this kind, as the utilization of exhaust steam for heating is about the only way in which the waste from an engine can be used. Few, except engineers, and least of all the business men themselves, seem to realize what happens in a steam plant after they pay the bills for the coal, and to illustrate where the heat goes that is developed in burning the coal, the following chart has been prepared.



Chart, Illustrating heat loss.

From this you will see that after the present unavoidable losses of the boiler and piping have been met, there is approximately 72 per cent. of the heat developed which is delivered to the engine, of which the best of high pressure machines are capable of utilizing or turning into useful work only about 7 per cent. or 8 per cent., leaving fully 8 per cent. of the heat generated to escape with the exhaust, unless some provision is made for using the exhaust for heating. This is about the only thing possible with a plant as small as 100 h.p. This exhaust steam at about 1 lb. back pressure, which, with the proper piping, is enough to incure circulation, has a temperature of over 212 deg. F., and ample for a dry kiln, as it will easily produce a temperature in a well designed kiln of 180 deg. You would have to put a back pressure valve in your exhaust line, and run a 3-inch pipe to the headers in the kilns, also put in more pipes until you have 28 or 30 pipes in each tunnel, all connected so as to receive an equal supply of steam, and pitched to insure good drainage. A first-class Mason pot trap will keep each of these coils dry if discharging into the open air or without back pressure. This arrangement will still enable you to use live steam at night and while the engine is stopped. The exhaust steam will positively do the work while you have it, and you will save all the live steam you have previously used, and besides this, cut down to a large extent the losses of the engine, as indicated by the chart.

The Use of Electric Trucks

Q.—"The present scarcity and high price of horses is bringing us face to face with the motor transportation problem and means by which lumber and finished product can be moved advantageously. Having noticed in your Question Box Department, a suggestion for the use of electric trucks driven by power generated by waste, we are writing for further information concerning this most attractive proposition. Anything you can tell us regarding the matter will be appreciated."

A.—At the time of writing the article referred to, the writer had in mind more particularly the disposition of waste consisting of shavings, edgings, bark, etc., which, during the summer at least, go to the burner or waste pile, and if you are so situated as to have more of this material than you can get rid of without extra handling, the electric truck proposition is certainly good. The only thing that has ever stood in the way of a wide application of electricity in this field has been the limited mileage available on a charge, but this defect has been eliminated by the development of a battery which may be overcharged, completely discharged or boosted, without injury. The boosting is the most important, for should a machine start out in the morning with a fifty-mile charge, and at noon have consumed twenty miles, it can on general principles, be allowed to charge during the noon hour at a very high rate, "boosted" so as to be able to start again at one o'clock with a full fifty-mile charge. Discharging of a battery on the road is now practically unheard of, and with this feature taken care of, and power for nothing, there is no form of transportation to touch the electric truck. It has no reciprocating parts, and few moving parts of any kind; it is easy on tires, easy to drive, unstallable where traction can be obtained, and what is most important, long lived, allowing a small depreciation charge and consequent low operating expense. It uses no fire of any kind, consequently can be operated and housed in the mill yard and insurance rates are not increased on account of it. Any of the makers of standard electric vehicles will be able to give you more information, backed up by liberal guarantees, and the writer per-

sonally is of the opinion that no lumber concern can afford to use any other form of motor transportation.

Utility of Air Compressor

Q.—"Regarding the article in last month's Question Box describing the use of compressed air for clearing machines of chips, etc., it is evident that part of the outfit would necessarily consist of suitable nozzles for regulating the flow of air, as it would never do at all to allow the air to flow continuously. I have made a general inquiry for nozzles of this kind, but cannot locate anything suitable, and would thank you to refer us to the proper parties, as we have air in the mill, and would like to make use of it."

A.—For clearing chips from machines which cannot be cleared satisfactorily by the usual suction draft, or in fact in any operation where it is necessary to have a clean table for the work, it is best to run a hose or permanent piping to a point where a fine jet opened momentarily will sweep the work clear. Somewhere in this line, conveniently placed to the operator, should be an automatically closing valve which can be operated by the thumb or foot as may be most convenient. Such valves are very simple, and the made by a number of concerns, the only one we know about at present being the Church Manufacturing Company, of St. Louis, Mo. If you want to try something that can be had nearer home, but which will cost a little more, get a one-half or three-quarter-inch whistle valve. This operates in the same manner as the air valve, and you can readily rig it to be operated either by hand or by foot. Where duplicate boring or cutting requiring jigs is done, it is generally necessary to clear the table after each operation; this takes time, and where the bits are large and fast running, there is considerable danger attached to the operation on account of the chance of getting a sleeve or loose coat caught on the bit, and here compressed air is particularly useful in that it will do the work quicker and better and safer than any other method.

High Speed Tool Steel

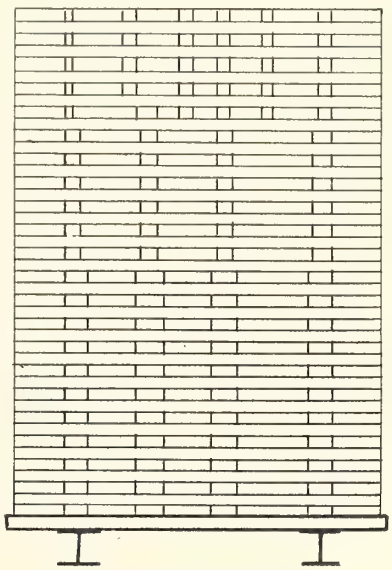
Q.—"Do you consider that there is any real advantage to be gained by the use of High Speed Steel in woodworking tools? We have always had to put up with considerable loss of time through filing and grinding but have taken it as a matter of course. Our tool maker now suggests the use of high speed steel, but we are somewhat in doubt on account of the extra cost of the steel and the uncertainty of results."

A.—High speed steel, as you apparently do not know, is now being used in woodworking tools to a considerable extent with excellent results, and there is no doubt but that its use will be extended, and it will prove as useful and economical in the woodworking as in the metal-working trades. You are probably familiar with the thin knife planer and other heads, which have made such an improvement in planers and matchers, resulting in higher feeds, less grinding and better work than has heretofore been possible. These knives are all made from high speed steel, and cannot be sharpened with anything but an abrasive stone on account of their hardness. You could, as a matter of fact, harden ordinary steel cutters just as hard, but as everyone knows, the edge would not last, but would chip or dull as soon as it got hot, and nothing would be gained. High speed steel contains, among other things, Tungsten, which raises considerably the melting and also the hardening temperature of the steel, while a very small addition of vanadium or chromium imparts a toughness and elasticity which makes the edges hard to chip or break. Such tools can be forced until they are almost red hot before they will lose their edges, and, in fact, up to a certain point, the hotter they run the better. Any boring or cutting tools which can be sharpened by grinding, and which are subjected to continuous and heavy cuts, are better made of high speed steel, the extra first cost being rapidly over-shadowed by the increased production of the machines and the saving in upkeep expense. Such tools require special treatment in hardening, but this your toolmaker can readily learn.

Kiln Drying

Q.—"It seems impossible for us to obtain satisfactory results from our dry kiln, the boards on the same truck even being in different conditions when removed from the kiln. We have been inclined to blame the kiln, and wanted to buy a new one, but feel inclined now to first see if the fault is not with our management rather than with the construction of the outfit. We would be willing to pay your expert's expenses if necessary to look at the kiln, or if the matter can be handled by correspondence, we shall be pleased to give him whatever information he may require."

A.—We think you have already pointed out your own difficulty when you state that "the boards on the same truck are even in different conditions when removed from the kiln," and that you do not need to go much farther than the methods of piling to remedy your difficulty. Be sure that **one-third** of each layer of boards on the lower part of the truck is air space. This allows proper circulation of air and shortens the time of drying, besides improving the quality of the lumber. About two-thirds of the way to the top restrict the air space somewhat, say to one-fourth, and



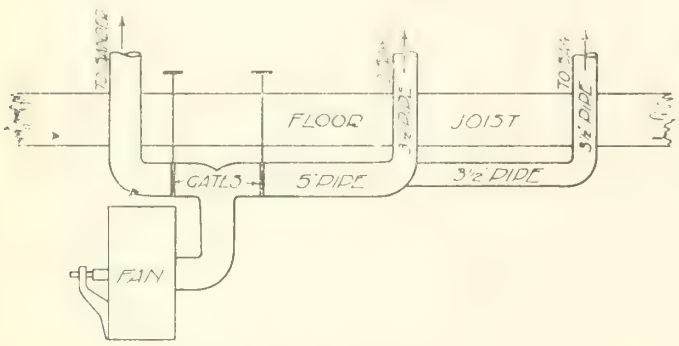
A satisfactory method of piling.

stagger the rows if it is one width stock you are piling, which will force part of the air out between the boards rather than allowing it to go straight to the top through the vertical passages. The more air you can get over each board, the better and quicker will they dry. If you restrict the circulation or do not direct it properly, the lumber, or that part of it which cannot get rid of its moisture fast enough, will case harden, check or stain, as the outside will dry before the moisture at the centre of the board can escape in the natural way. Sometimes, after men have operated a kiln for a

long time, they get slack, or conflicting orders destroys their interest, so that the original instructions are lost sight of. Dig out the old instructions and instruments and make the men follow them, and observe the above hints on piling, which you will probably also find in the instructions, and we think you will have no further need for our expert.

Drawing Heat from Building

Q.—"The writer would ask you to kindly give him your advice on the following: Our factory is not fitted with a shaving collector, as only one floor is used for machinery, but in winter time, when doors and windows are all closed, the men are suffering from dust from the machines. Now we have a drawing fan connected to our sanding machine, and our intention is to put up branch pipes to draw this dust, but the proprietor objects to this, as he fears it will draw quite a lot of heat from the building. The size of the inlet of the fan is 3 in. x 7 in., and the outlet 5 in. x 10 in., and the speed 2050 r.p.m. It is located in the basement under the sander and discharges into a dust box outside the building, which is provided with a vent to the roof. The machines we wish to connect are:



Method of connecting up rip saws.

1 drum sander, 1 pony planer, 2 rip saws. Your kind reply on this subject will be greatly appreciated."

A.—Answering the objection of your proprietor first: we think that as the fan in question is running at the present time with draft enough to clear a sander, it is removing as much heat from the room as it would if connected to the various machines also, so that the installation of additional outlets would not interfere seriously with the heating arrangements. Further than this, we can say positively that a dust-laden atmosphere interferes seriously with the amount of work your men can do, and also makes the shop particularly dangerous from fires, so that rather than costing your company more for heating, your suggestion is a good one in that it will make the men more comfortable, and at the same time effect a saving which will pay for a good installation many times over. The fan you have is very small, and the best thing you can do at present is to connect up the two rip saws which make most of the dust, and install gates in each pipe, so that the draft will be on either the sander or the saws, but not on both, as the fan is not large enough. The connection would be something like the above sketch, which will probably be all the plan required to do the work. Speed the fan to about 2,500 r.p.m. if the draft is not sufficient at the present speed.

If your varnish is too thin it will not give you a full-bodied coating, but if too heavy a varnish, then it will not flow out well. Light-bodied varnish brushes out easily and does not show the brush marks like heavy varnish does.

The Hardwood Market

THE hardwood market has not been characterized by any marked revival during the last month. The trade might be said to be in a state of suspended animation—this being attributable, of course, to the uncertainty of the present business situation and the extent to which recent financial developments have limited the purchasing power of the manufacturer. In spite of the depression, however, prices are maintained—a fact which points to solidity and anticipates a better state of things within the not far distant future. Some furniture lines have been doing fairly well, and the demand for the oaks, for walnut, and for birch has been satisfactory.

The general market situation is sized up by our contemporary, The American Lumberman, in the following paragraph:

"The hardwood branch of the lumber industry is still without notable encouragement. But while demand is still of a restricted character, there is a much stronger tone in the market, and improvement is noted in many directions. Plain oak is selling better than for many weeks, with prices slightly advanced. Quartered oak is still strong and poplar is getting better. Ash is selling fairly well. In cypress the mixed car trade continues of fair volume. Cross ties are meeting with a good demand. Production is still on the December basis, several of the mills running only part time. Prices are steady."

The editoral comment of The Hardwood Record, of Chicago, is as follows:

"Any changes that have taken place in the demand for respective hardwoods have retained them on the same comparative plane of demand. Quartered oak is still in pretty fair shape and all box lumber is moving in a satisfactory manner. Some mills in the north and south have a great deal of lumber on hand, but it is a fact that the curtailment which has been nation-wide has materially cut down stocks at all mill points. The continued policy of buying for immediate use at the yards and factories has prevented any general piling up of stocks at receiving ends. The consequence is that with a moderate resumption of business a great many lines will be seriously broken, and a firmer price level will consequently come into effect."

Southern Hardwood and Veneer Market

(Special to the Canadian Woodworker)

Louisville, Ky., Feb.—Although the volume of hardwood business has not increased materially during the past month, the market is undeniably firmer. There are several reasons for this. One is that production has not been increased to amount to anything, though "the largest hardwood mill in the world" is operating again. Consumption has meant a net deduction from the total available supply. Besides, starting up a mill is not going to have an appreciable effect on the situation for some months, for it takes a good while to cut and cure lumber, and the hiatus that has existed, and will continue to exist for some time to come, as far as the production at large is concerned, has certainly knocked a hole in the hardwood stocks of the country.

Another thing that has had its effect is the withdrawal of the lumber sold on contract. A number of big orders have been placed, and while the total

of these is not sufficient to make up for the reduced buying on the part of consuming trades as a whole, it has had the effect of firming up the market. In some cases large lots have been delivered at once, and in others actual shipping dates have been specified, making contracts of this sort much more active factors in determining market conditions than they would be were the buyer merely to contract for an indefinite quantity to be shipped at his option. In a case of that sort, the lumber covered by the contract would be as much in the market, and would have no more effect in determining values, than if no contract had ever been placed. But the tendency to make contracts more specific, and the desire of important users to cover their requirements "while the buying is good," has resulted in deliveries being made in many cases, and shipping dates named in others, so that contract business has served the purpose of cutting down supply still further.

There is an actual shortage of lumber in certain directions. While it is true that there are always some items which are hard to get, it is particularly true at this time. Thick stock, for instance, has been wiped out of existence in some lines. The war is chiefly responsible for this. Gunstocks, wagons and other vehicles have consumed a large amount of thick material, and the result is that the consumer who is looking for hardwood lumber of this kind is sure to be convinced before he gets through that the market is anything but easy. In fact, mighty fat premiums have been paid in some instances for dry lumber of certain dimensions, which seemed to be literally off the market. There is enough of it, probably, in the way of odds and ends in scores of yards, to make up a supply, but the problem comes in locating and assembling it.

Judging from the way business has been moving of late, prices on hardwood lumber are probably $1 higher than last month. This is not much of an advance, in view of the fact that quotations in many cases are still too low to enable the stock to be manufactured at a profit; but still it shows that an improvement in sentiment has taken place, and that buyers appreciate the stronger technical position of the market and are willing to put their payments up a notch. Oak prices show an interesting condition. Quartered oak, especially the upper grades, has been selling at fairly good prices all the way along. Plain oak has been slumping, but of late plain white oak has stiffened up and red oak has been sold off from white oak prices several dollars a thousand. The explanation is this: Owing to the improved position of quartered oak in the market, most manufacturers with white oak logs have quarter-sawed them, thus reducing the proportion of plain white oak. As quartered red oak does not bring nearly so good a price as quartered white, there was no inducement to quarter-saw red oak logs, which were accordingly cut plain. This has resulted in the supply of plain red oak being much larger than that of plain white, and the differential in price has therefore resulted.

The strengthening of the market has been exhibited in a number of cases in connection with negotiations extending over a period of a few weeks, where considerable lots of lumber have been involved. The game of the buyer has been to hold off and endeavor, by virtue of the size of his order, to secure a lower price than that quoted; on the other hand, the seller has seen better market conditions in sight, and has raised his figures, and the result has frequently been that the buyer has been forced to pay more ultimately than he could have been able to get the lumber for at first. This is in striking contrast with the sort of conditions which have prevailed for some time heretofore.

The furniture exhibitions this season were interesting because they demonstrated that the manufacturers are seeking, as never before, for a new note. Novelty is the demand which is heard on all sides—novelty in design, novelty in treatment, novelty in woods, so far as may be. Nothing else accounts, for instance, for the marked tendency to feature enameled furniture. Some people believe that this can never be more than a fad, or a specialty which will not be suitable for general sale; and yet certain manufacturers of bed-room suites have been giving more attention to white and ivory enamels than anything else.

Another indication is found in the warmth of the reception which has been given to American walnut. Of course, the time was ripe for this wood; Circassian this season is scarce and high on account of the war, and brown woods are being popularized anyway. But aside from all that, the furniture manufacturers who are now playing up American walnut as one of their "best bets," undoubtedly did so as much because they were looking for new things in all directions in their business, as because they thought that American walnut could come back. The way furniture makers are using American walnut seems to indicate that when the war is over there will be no need to develop the export market which formerly absorbed the material, as the domestic demand should be ample to take care of the supply.

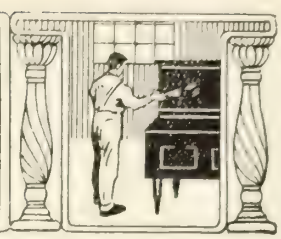
By developing new ideas, as long as they are based on sound sense and sound artistic standards—which must be considered first if the product is to get a decent reception—the makers of furniture seem to be on the right track to increase their business. Though it may be argued that furniture is made for permanent use, and should be built with an eye to this, there is no denying that the consumer wants what is the fashion; and she will lay aside her old furniture in favor of the new every time. Therefore the logic of the situation seems to favor novelties, if for no other reason than to provide occasional stimulation and lend the fillip of interest which has not always been present.

According to the handbook issued by the provincial government, there are now *272* sawmills in British Columbia, employing about 5,000 men, the output of lumber in 1912 being 1,330,000,000 feet. There are sixty shingle mills, with a daily capacity of 5,000,000 shingles. The capital invested in the timber business is over $200,000,000.

Keeping files clean and free from steel and dust is a very simple matter. First, take the end of a hardwood block and follow the cutters, pushing out the foreign matter which has accumulated, and grease the teeth or cutters with olive oil; then repeat the operation and the file is ready for work. It will be found that the steel dust will drop out, without filling up the teeth. This treatment should be repeated occasionally to prevent the file becoming dry. Many files are only half used up because of their becoming filled up and smooth, causing them to slip over the work. A steel-wire brush is also good for cleaning them.

Do not be deceived by the appearance of the surface of the varnish coat; it may seem perfectly dry, while beneath the surface the varnish may be soft. Give it ample time.

THE FINISHING ROOM



Experiments in Finishing Gum—A Likely Substitute for American Walnut

By Walter K. Schmidt

THE manufacturers using gum wood have been groping about in an endeavor to find a good shade for this wood in its natural state. The uses that gum wood is put to today are quite diversified. It is being put out as Circassian, and as mahogany, but now there is a strong disposition to give it a shade and put it out under a style of its own. At the same time it makes up beautifully when stained to produce the same shade as that of the adopted color for American walnut. The stain material employed is nothing more than walnut crystals, an imported dye, universally known to the trade, and a very weak solution at that. The dye is prepared by dissolving any given quantity in boiling hot water, allowing it to cool, and then passing it through a filter. This concentrated solution is then diluted until it produces the desired shade. One coat of stain is all that is applied. From this step on the procedure is the same as in any finishing problem. But, as the finishing of gum wood and Circassian walnut has been under consideration, experiments were made with materials that could be recommended after satisfactory results had been obtained. We all know that in the finishing of genuine Circassian, the use of lacquer is recommended. Undoubtedly this makes a beautiful finish. It might be said at this time that when the experiments were first undertaken we had no idea that there was a war close at hand, and that the results of this war might greatly affect the cost of lacquer, for gun cotton is one of the main components of lacquer. Therefore, it might be opportune to give in detail how the finishing coats were produced, so that those interested in gum can follow some of the suggestions in making their own experiments. Whether it is gum wood or Circassian that is to be finished as Circassian walnut, the question of the last coat always spells lacquer. Circassian, as we know, is finished in natural. Gum is only stained to bring it to its natural Circassian color. Some call it overcoming the red in the gum. The final achievement must be an exact reproduction of the genuine article.

Many complaints have come to us of the difficulties encountered in the production of lacquer finishes when the work is afterwards exposed to the atmospheric conditions peculiar to the seaboard. We have been asked what chemical change takes place in the lacquer. It is explained that the finish turns white. Others say it turns dead. One man stated that it seemed to powder off. The truth of the matter is we are unable to say what chemical change takes place. We don't know to what condition the furniture was subjected. The trouble may be that a lacquer finish is a sensitive finish. Its very make-up indicates that it is. A delicate compound has little resisting power. The body of it has the nature of drying within itself, forming an impervious body of its own. Now imagine this spread over a large surface. We can liken it, in an explanatory way, to liquid court-plaster. You have put it on your finger, and it stuck like grim death. Another time you used it and it peeled off by itself. What's the answer?

Having these things in mind, we tried waxes, shellacs, substitute products for waxes, and found that beautiful results are obtainable. By this time we had several things in mind. We wanted to produce a finish that would be on the lines of convention. We wanted to follow a method free from pitfalls. We wanted something that would stand up under all the conditions that it might possibly be subjected to. It should work equally well on gum and on Circassian, so that if a piece of furniture be built of both kinds of wood, there would be no difficulties encountered in the selection of the finishing coats. The experiments were made to establish facts that would be of benefit to those who are contemplating the adoption of gum wood for making up some of their line. What can be produced by the use of wax is known to every manufacturer. The use of lacquer remains an unsettled opinion. Its use is not new, having first been employed on a finish put out on gum as satin walnut and in connection with Verdi green. But with war prices staring us in the face, the price of amyl acetate going higher, due to its limited production and increased consumption, it seemed preferable to establish a finish entirely eliminating the use of lacquer.

Another Experiment

Paraffine wax was, therefore, tried. Its application along the lines of French polishing cannot be recommended, as the labor cost would increase the price of production materially. Spirit varnishes of various compositions were used. Spirit varnish, made up for the purpose, was tried in an endeavor to get an absolutely transparent, colorless coating that would have a large amount of resisting and protecting qualities. Nothing to be recommended was obtained by these experiments. The fact that the results had to be a line of practical manipulations and methods employed in the manufacture of furniture in our present day institutions was kept constantly in mind, realizing that the best results must be obtained by a method using a minimum amount of material and labor. Naturally, during all these trials many ideal results were obtained. All the time and labor on this gum wood, but to recommend in detail, and to give in print, all of the various methods and materials employed and time consumed would avail nothing to the manufacturer of gum wood furniture.

In conclusion, the fact adduced was that gum, with a very small amount of stain, will make a much more pleasing appearance than if finished natural. Without the stain, it takes on various tones of cold gray which is difficult to describe, but which it is certain will not have the pleasing effect which comes with warm tones which are more desirable and will wear better. Therefore, the application of this brown overcomes this possible difficulty, and as the wood ages it tends to mel-

low down the cold effect that the gum wood is prone to assume. This does not necessarily cover the process of staining gum wood when it is used as a substitute for American walnut. In other words, the gum wood used in this sphere is stained to match the prevailing style of American walnut, and finished in the same manner. Our sample was finally coated with a product put out by the Sun Varnish Company, of Louisville, Ky., which they market under the name of "Circassian Coat." They state it has been made for a quick drying, long oil varnish. We found that it works and flows perfectly under the brush and will dry hard enough over night to sand without clogging the paper, rolling like shellac. This makes it possible for it to be used as a surface builder as well as a finishing coat. The experiments showed further that on Circassian it is ideal as compared with any of the other methods. It is both acid and alkali proof, and it will not turn white in water, nor will it skin in the can. Thus it meets all the requirements in the finishing of either gum or Circassian, no matter what the shade of the finish. The main point is transparency, such as you want on Circassian finishes. In Circassian finishes, is meant, of course, all the kindred kinds.

We have found that where this Circassian coat is used for the purpose of a surface builder, a thin application is preferable, as it insures perfect hardening as a foundation; then a coat a day can be applied under perfect drying conditions. This material will then stand a hard rubbing, even machine rubbing, and for dull rubbed work it is ready on the fourth day.

The manufacturers who are using or contemplating the use of gum can readily get together and establish a uniform color. The readers know that the information adduced is available by them through this department. By a process of elimination, the methods employed are those that have been found safe to recommend in a manufacturing way.

Gum wood is bound to increase in value as well as in use. It will soon be on the market as American walnut, if it is not really established in a class by itself as a walnut. Then put on the market goods made from selected stock, and quarter-sawed, giving all the beauties of the wood an opportunity to be elaborated upon by the finishers' art, and see the favor which it will meet.—The Furniture Manufacturer and Artisan.

Practical Points in Piano Finishing

By A. Ashmun Kelly

THE case inclosing the piano parts, such as the hammers, strings, etc., is the principal part of the whole work. This case is never nailed together, but glued; even screws are not considered sufficient for the purpose. Then the outside is varnished. It will take about 30 lbs. of glue and over a gallon of varnish. Of the time required to make the instrument, almost one-half is taken up in the gluing and varnishing, this including the drying of both, of course, and this time is quite considerable in the varnishing, as we shall presently see—almost, if not quite, three months for the varnishing and finishing alone.

The wood of the case must be prepared carefully, be well smoothed and levelled, then it must be well filled with the best grade of filler. Of the wood it need hardly be added that it must be the very best obtainable. It may be walnut, or oak, mahogany or other suitable and fine-looking wood; or it may be veneered or stained black, and in all cases, with the exception of stained work, the treatment is identical.

Aniline dye stains will not do for this kind of work; nothing but vegetable stains will answer. After the staining, two coats of filler are applied, paste filler, which is to be rubbed off in the usual way. Two coats of stain, also, which I had almost forgotten to mention. The filling is always allowed forty-eight hours for drying before sandpapering. The paste filler is always stained, and it is sandpapered smooth as possible. It may be that in some cases one coat of filling may do; of this the workman must be the judge. After this, the rubbing varnish is applied. This varnish must be high-grade, not too heavy of body, and it should be applied in a room having a temperature not much below 70 deg. Fahr. From five to seven coats of this varnish are applied, a week between each, rubbing down with fine sandpaper. The last coat of rubbing varnish is rubbed with fine pumicestone powder and water, under a felt rubber. As pumice sometimes contains some grit, which would scratch the work, it is always best to pass it through fine haircloth first. The American pumicestone is very apt to be gritty, but the foreign is generally free from it. After rubbing with this, the work should be well washed down with water, to remove every particle of pumice. Then wipe dry with a clean chamois skin.

Then the job is ready for the polishing varnish, which is flowed on freely and brushed out level. A soft hair brush is used for this purpose. After standing for a week, the job is rubbed with pulverized rottenstone and water, with the palm of the hand for a rubber, and this rubbing continues until a polish appears. Then it is washed off clean, dried with the chamois, and rubbed with a few drops of sweet oil on the palm of the hand, after which the oil is removed by spiriting off, or with a clean, soft cloth slightly dampened with alcohol. Only grain alcohol may be used, and it requires a deft hand in order to not cut the varnish. It will be found safer for the inexpert to use dry cornstarch instead.

From one week to ten days are given for the drying of a varnished coat; two weeks would be better still. This because of the many coats applied, for each should be perfectly dry before another is applied. Many of the worst troubles in the varnish room come from undry varnish. Trouble also comes from improper varnish, too, of course. For some purposes kauri varnish is excellent, but for piano work only Zanzibar gum varnish should be used for the finishing. It is the hardest sort of gum used in piano varnishes. Even when carrying the same amount of oil that a kauri gum varnish carries, the Zanzibar will give a harder surface, and hence make a better polishing surface. Inasmuch as the finish will have to bear the brunt of the hard knocks, the varnish on that should be hard. It should be a quick-drying non-elastic varnish for all the coats but the finishing, which should be quite elastic.

After the surface of the case has been made smooth, stain it with the proper dark or antique oak water

stain, let it stand until next day, then sandpaper smooth and fill with dark past filler. The filler must be well rubbed into the wood with a leather pad. Then let the job stand until the twelfth day and apply a coat of orange shellac. Next day sandpaper, following with a coat of piano rubbing varnish. On the twenty-third day apply a coat of piano rubbing. On the thirty-ninth day another coat of the rubbing varnish, and still another on the forty-seventh day. On the sixty-first day scour with pulverized pumicestone and water. On the seventy-fifth day flow on a coat of piano polishing varnish. On the eighty-ninth day rub lightly with flour pumicestone and water. On the ninety-first day rub to a surface with pulverized rottenstone and water. On the day following this dry-polish with the palm of the hand, using powdered rottenstone. On the next and final day oil off and clear up with alcohol, or cornstarch and cloth.

While the piano case is in the cabinet shop, sponge it well with clear cold water; let it dry, then sandpaper it carefully. Then fill and rub filler into the wood with the rubbing pad. After three days sandpaper with No. 0 paper, then apply a primer. On the seventh day sandpaper lightly with No. 000 paper, making the surface perfectly smooth. Then apply a coat of kauri piano rubbing varnish. On the twenty-first day sandpaper as before and apply another coat of rubbing varnish. On the thirtieth day dub with No. 1 powdered pumicestone and water to a surface. On the thirty-fourth day apply a coat of elastic Zanzibar piano polishing varnish. On the forty-sixth day rub lightly with No. 0 pumicestone and water. On the fiftieth day flow on a coat of Zanzibar polishing varnish. On the sixtieth day rub with rottenstone and water. On the sixty-fourth day dry-hand polish with refined velvet lampblack, following with a wash-in goff with clear cold water.

Finishing a Rosewood Case

With the exception of the stain, the process given for finishing an antique oak case may be followed in the finishing of a rosewood case. For a dark rosewood case give a coat of alcohol red stain, sandpaper smooth and fill as directed for the usual rosewood finish. This is the same as for mahogany, namely, take equal parts of best whiting, plaster of paris, fine pumicestone powder and litharge, all by weight, adding for color Vandyke brown, burnt sienna and French yellow ocher, in proportion to form a suitable color. Mix these ingredients to a paste with a mixture of 1 pint of japan, 2 pints of boiled oil and 3 pints of turpentine; run the mass through a hand mill.

Following the filling comes the coat of orange shellac, which is to be glazed over with asphaltum varnish. After this point has been reached, the process is the same as for the oak case, beginning with the thirteenth day, which see.

Much time is saved by means of the mechanical varnisher, which dips the parts into a vat of varnish. A rack holding the parts of six pianos, and several racks being used, placed in a framework, the same is very gradually immersed in a vat of varnish, where it is allowed to remain a few minutes, when it is as slowly withdrawn. You can hardly discern the motion of the frame as it enters or emerges, so that the surplus varnish is permitted to flow off and back into the vat without leaving a wrinkle on the work; the varnishing is done perfectly, ever so much smoother and more level than with the brush. Not only is time and money saved by this method, but all joints are rendered damp-proof, an important matter in the shipping and exporting of the pianos when done. The varnish, of course, preserves each glued part from the action of moisture.—Veneers.

Problems of the Foreman Finisher

By D. Monroe

EVERY department of the woodworking factory has its problems, but there are none greater or more difficult to solve than the problems of the finishing room. Mistakes may occur at any stage of the furniture, piano or any other woodworking process, from the lumber yard to the final touches in the cabinet room, and never be detected until the goods reach the finishing room. Many of these affect, to a considerable extent, the finishing process, and, while a remedy for the present case may be found, the finisher cannot solve the problem because the cause of the trouble is not in his department.

One great trouble I have found in many plants is that the manufacturer does not care to pay any more than absolutely necessary for material. Some will buy the cheapest ruptured veneer and will say the finisher should be able to correct this. Again, one will find manufacturers buying No. 2 or possibly No. 3 common oak, the stock being loaded with imperfections, or some will buy pinworm oak or chestnut and will say, "The filler should fill these holes and they should not be visible after finishing." Wonderful economy!

Another problem that confronts many finishers is that presented by a variety of woods in one piece. It is not uncommon to find all colors of oak used, for instance, in furniture, no attention being paid to matching; the finisher is told to rush the job, as no time can be taken to match the shades and get a uniform color. The piece, after leaving the finishing room, may be severely criticized by the manager or superintendent. The finishing room foreman tries to explain that more attention should be paid to the selection of the stock in the piece, and that this little time would bring financial returns. The piece is sold to the dealer; he has it on his floor a long time, and the result may be that he will give his business to manufacturers who find it is profitable and good business to buy good material and see to it that it is nicely matched. This should be done in the assembling of the stock.

In matching stock I do not refer only to lumber, but to veneer as well. How often we stop in front of a furniture or piano store and admire the beautiful matching of veneer, especially so in crotch mahogany and Circassian walnut. If the job has been nicely done we never tire of it. It does not require an oily tongued salesman to sell this class of material. The piece sells itself, and in many cases at a very satisfactory profit to the manufacturer as well as the dealer.

Good machine work is imperative if results are expected. Did you ever notice wavy table or dresser tops? Of course you have. This not only applies to solid, but to veneered tops as well. Ask the average finishing room foreman what trouble he has had along that line. He may employ old men or young boys in the staining and filling rooms, the management arguing that the cheapest labor should be used in these departments. He cannot stand over every man, inspecting every piece. In the large factories inspectors are supposed to inspect every piece before de-

livery is made to the finishing rooms; not so in the average plant, however.

In many factories, to this very day, veneer is laid on a core stock that came direct from a planer and was never sanded; or the cross-banding and face veneer were laid at the same time, without anything being done to make smooth and even the surface of the cross-banding. The stock is cleaned up before it is thoroughly dry, after being veneered, and the shrinking which caused the waves took place possibly after it passed through the scraper.

If the machine room, cabinet and veneer room foremen would co-operate with the foremen of the finishing rooms, much annoyance and expense would be avoided and better quality assured. Finishers are not infallible, but the fact that their own mistakes must be remedied in their own department is an incentive to greater perfection and fewer errors.

Staining wood work is an art that has been known for hundreds of years. We are told that formerly the stains penetrated much better than do our modern stains, and, once the work was done, it lasted almost forever. An expert stain man recently said: "If the old-fashioned way of staining were still in use it would be impossible to change the color of the wood work. Oil stains are far more easily removed than water stains. Therefore, it seems to me that where it is desired to have the wood thoroughly penetrated by the stain, and where the stain is expected to last for many years, water stain is to be preferred; but where there is a possibility that the owner may want to have the color of the wood work changed within a few years, it is better, by all means, to use oil stains."

The art of staining or coloring must be classified distinctly by itself. Stain must be, above all things, transparent, so that the natural texture fibers and pores are absolutely retained. The characteristics of a high-priced wood must not be lost. On the other hand, the process employed should enhance rather than depreciate the nature of the wood. It is, therefore, requisite that the coloring employed must be absolutely soluble, either in water, spirits or oil.

Water stains which have been prepared should be, first of all, labeled. Unless you prepare fresh batches every day they should not be kept in anything but earthenware or glass, and well corked. It is a good idea to put the proportions of water and stain used to make that solution on the label. The importance of this will be appreciated where colors must be matched.

It is not uncommon to find filler in finishing room as "hard as a rock." This is usually due to the fact that the filler is old or was probably put away in an open vessel. Where fillers are used and where colors ground in oil are used for coloring these fillers, it is much better to buy silex in dry form and prepare the filler for each job. With the filler it is not necessary to have the colors absolutely the same. By this I mean that in preparing the paste it is only necessary to give the filler either a black or brown shade, such as shown by the pores of the wood. Filler is not expected to be transparent, and where it lies in the pores of the wood it is always thick enough to produce the desired effect, whether it be absolutely identical or not.—Veneers.

Among the lighter effects birch is finding some of the favor it deserves, but not enough. The natural beauty in birch has never been properly recognized in the cabinet trade.

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Veneers and Panels

Kiln-Drying Veneers and Panels

By Harry Hunter

THE troubles resulting from improper drying, which affect panel manufacturers, and a part of which are common to all manufacturers of wood products, are blistering of veneer, veneer shrinkage, opening of joints, warping, case-hardening, honeycombing and checking. As you all know, case-hardening, honeycombing and checking result from excessive heat or lack of moisture or from both, the surface drying first and preventing the escape of moisture from the centre of the stock. The other troubles are caused by under-drying. I do not intend to convey the idea here that improper drying is always the cause of all these difficulties. A part of them may, at times, be caused by other things, regardless of how the product is dried. But I do say that where the stock has not been properly dried some of these troubles will result.

Unsuccessful drying is the result of improper conditions as to heat, humidity and circulation in the drying chamber. These conditions may be all or some one or more of the following: Insufficient humidity, insufficient circulation, excessive heat, lack of uniformity as to heat, humidity and circulation in all parts of the kiln, and the variation of these conditions from time to time during the drying period. While it is perhaps not possible to dry each individual piece of wood in the same degree, it is certainly true that approximate uniformity can be attained only where the conditions are uniform throughout the drying chamber. The temperature cannot be permitted to vary. Likewise, the amount of moisture must be uniform throughout the room. There must be a continuous and rapid supply of fresh air to all parts of the kiln and the prompt removal of the air after it has been used. The problem, therefore, is first to produce these conditions, and, second, to control them once they are produced. To produce the conditions as to heat and humidity, it has been found best to heat the air to the desired temperature and humidity it to the proper degree before it is permitted to enter the drying chamber. This, of course, cannot be done where the radiation is inside the drying room proper. There are additional objections to having the radiation in close proximity to the drying product. The best results in rapid and uniform circulation can be obtained, I believe, by having both the intake for fresh air and the out-take for impure air on the floor line. In this way the warm air rises rapidly and passes to all parts of the room, while the cooler impure air sinks to the floor line and is removed. This insures a constant and ever-changing supply of fresh air, heated and humidified to the proper degree, and brings it continuously into contact with the work to be dried. The control of circulation, as well as that of heat and humidity, should be taken care of automatically.

I desire at this point to emphasize the importance of humidity in any drying system and that there must be some provision made for producing and controlling it. The amount of moisture naturally in the air is uncertain, varying with the outside conditions, and cannot be depended upon. There must be some method for producing it, but any arrangement which provides for it without accurate control and regulation will not produce results. Moisture in the drying air is responsible for the open pore, and no wood product can be successfully dried without it. Without an open pore, the centre of the stock cannot be properly dried, while the outside case-hardens, and honeycombing sometimes results. On the other hand, stock dried with open pore can be more easily worked and presents a better surface for the adhesion of glue. Veneer and cut stock will be more pliable, flatter, and will have a good color. The stock can also be worked in less time, with less waste and less expense.

With the drying conditions regulated and controlled as already indicated, lumber can be best dried at a temperature of 150 deg. F., with the humidity held at 57 to 63 deg. In drying panels the temperature should not be so high, 120 deg. being the limit.

The following results were obtained from the tests made in a factory which was having most of the troubles above enumerated. They were obtained under the conditions described as being essential to proper drying. The first test was upon a number of panels taken from the glue room. The first moisture test on the core stock showed a variation in moisture content from 3 to 14 per cent. The first moisture test on the veneer and cross-banding showed from 6.7 to 8 per cent. of moisture. After being redried under the above described conditions for fifteen hours, the core stock showed a variation of from 3.5 to 4.5 per cent. in moisture, and the cross-banding and veneer showed from 2.9 to 5 per cent. After the panels dried, laid, they weighed 65 lbs. 4 ozs. After being dried for 22 hours, at 120 deg., the weight was 63 lbs. 8½ oz., a loss of 1 lb. 11½ oz., or an average loss to the panel of 3.4 oz. After the panels were dried they showed a moisture content of from 4.7 to 6.7 per cent., an average of 5.75 per cent.

A test of twenty oak boards taken from the tempering shed to be used as core stock showed a moisture content ranging from 2.9 to 19.4 per cent. Eighteen maple boards taken at the same time showed a variation of from 3 per cent. to 6.7 per cent. moisture content. These boards were taken from the same piles at the same time and had all been kiln-dried. After being re-dried for thirty-six hours at 140 degrees the oak showed a variation in moisture content from 2 to 3.8 per cent., an average of 2.7 per cent. The maple boards showed a variation of from 1 per cent. to 3.6 per cent., an average of 1.6 per cent. This stock was worked up into six five-ply oak panels, size 18 x 33, and six five-ply mahogany panels of the same size. After being laid the oak weighed 57 lbs. 4 oz. and the mahogany 52 lbs. 15½ oz. After drying, the oak

weighed 55 lbs. 4 oz. and the mahogany 50 lbs. 13½ oz. The loss of moisture on the oak was 2 lbs. ½ oz., an average of 5.4 oz. to the piece. On the mahogany the loss was 2 lbs. 2 oz., or an average of 5.6 oz. to the piece. The moisture content in the oak after drying was 7 per cent.; in the mahogany, 7.1 per cent.

Efficient and Inefficient Methods of Handling Glue*

By Alexander T. Deinzer

A few years ago I entered a furniture factory early on a Monday morning (I must not forget to say that this was during mid-summer). When I opened the door I was nearly overcome by an offensive odor which I recognized as coming from the glue room. The workmen did not care to work in that department. In fact, the workmen throughout the entire plant were very angry. I found the man in charge of the glue room and suggested that he must have old glue in the cooker, some that had possibly been left there for a day or more. He said: "Yes, but the glue is no good or it would not deteriorate."

I have found glues that will stand a lot of abuse. Nevertheless, every glue will decompose when left over night, especially over two hot nights and one day, as was the case above cited. Glue should be free from heat during the night and should not be mixed with fresh glue the next morning for full value will never be secured from the glue used that way.

Some manufacturers and glue users may say: "Glue is far superior in quality to-day to what it was fifteen or twenty years ago." This is true, hence your product should have been improved.

There are a few small cabinet shops when the old conservative cabinet-maker will use possibly a few pounds of glue every week. This glue is kept in an old-time glue pot (having a hot water container) and whenever the cabinet-maker requires glue, it is placed on the back of a stove, the water heated and the glue dissolved. No thought is given to the exposure of the glue to dust, etc. The brushes are dirty, the skin forming on the surface of the pot gradually accumulates and slowly decomposes. This may or may not fall into subsequent melts, thus contaminating them.

It is possible to save considerable of the accumulation and to work it up to good advantage in veneering. Detach scraps of dried glue adhering to the glue pot, cooker or glue spreader and examine them. If clean, place them in a kettle or cooker. After thoroughly cleaning, and removing all particles of glue, soften the selected pieces by means of heat, after adding a sufficient amount of water. You may also do this to dirty scraps, but it is best to re-heat them in a separate cooker, permit the dirt to settle and the supernatant glue may be used without risk. Should the glue, however, be sour, it is necessary to throw all pieces away. Remember that glue is extremely sensitive to impurities. Cultures of germs are grown by bacteriologists in gelatine glue because they afford an ideal breedng place for germs. Keep your cookers, glue pots and spreaders clean.

There are a few manufacturers who will buy bone glues for veneering because they are cheap. Bone glues do not have the binding quality nor the lasting quality of hide glues. Climatic changes will soon weaken joints made with bone glues and no matter how dry your lumber and thoroughly the pieces were jointed, it will open. There are now many lines of trade where the use of bone glue is imperative to secure the thorough class of manufactured goods that modern merchandising demands. However, as stated, the furniture manufacturer should not use them.

Several furniture and piano factories are using mixed hide and bone glues. The jobber or manufacturer will take a certain percentage of very strong hide glue and mix with bone. Good results have been reported. One of the largest jobbers doing this has requested the writer to make some tests and report results. Have been too busy to do much work in my laboratory and do not intend to express an opinion until I have made thorough physical tests.

Some manufacturers will buy one grade of glue, using it for veneering as well as joint purposes, gluing oak, pine, mahogany and an endless lot of other woods with the same glue, using the same proportions of water and glue, etc. I care not what glue you buy, it is absolutely necessary for your glue room foreman to understand the different textures of the different woods and to mix his glues to meet the requirements as he understands them. When making this statement I mean a man who understands woods and glues. In mixing glues do not guess at the proportions of water and glue. Weigh the water and glue. Mix up your proportions as you require them for the different woods and do not trust this work to some ignorant, stubborn workman who could possibly not read his name if he saw it in print. I have met too many such fellows in glue and veneer rooms. They may be good fellows to clean up in and around the factory, or juggle lumber, but they have not the ability to work in a first-class gluing department.

Lumber Must be Right

In order to get good results in your glued up work your lumber must be dry. Not too dry, however, for you would experience as much trouble as when not dry enough.

You have all read time and again what overheated cauls will do to veneered work. It is, however, not uncommon to find factories all over this country (including some of our very largest progressive plants) where the jointed stock is heated so that it is very hot. The stock is glued up and the glue room foreman cannot understand why joints open. It may surprise you to learn that where stock has been thoroughly kiln dried, the glue is of the right quality and your stock has been stored in a curing room in which the temperature does not drop under 70, it is unnecessary to heat such stock before gluing. This is true, nevertheless. Your grandfather and mine would not think of gluing joints any other way than heating the stock. They could not afford to do so in those days, but we have better drying conditions.

I hope this is not misunderstood. I do not say that every furniture manufacturer can eliminate the expense of heating his stock before gluing. I well

* From the Furniture Manufacturer and Artisan.

know that most of your factories are not heated over night and I know of factories having no drying kilns where the stock is taken from the yard or shed, machined and delivered to the gluing department. Unless you have modern kilns, your factories heated day and night, do not attempt to glue your stock without heating. Our laboratory experiments have shown surprising results. However, we have so much to discuss and the article is already so long that nothing more can be said about heating stock in this article.

I have investigated efficient glue jointing and have made a great number of tests. I am convinced, however, that the slack centre joint is the joint for long stock, but on very short pieces the straight joint is more satisfactory. When gluing a slack centre joint apply the pressure to the centre of the stock first. This is one reason why some experience trouble with slack joints.

We try to work up our waste very closely and use considerable 4/4 inch waste stock in couch leg back boards. These pieces are 10 inches long by from 8 to 9 inches wide. When the writer came to this factory he found that one man was employed gluing them by the old-time wedge system, and from 500 to 600 back boards were considered a pretty good day's work. He would heat his stock leisurely, walk to his glue bench, spread the glue by means of a brush, place the stock in the wooden clamps, handle the clamps, etc. This was an eye-sore to me and I decided to eliminate it. I had the stock machined with straight joints. Made a suitable bench which could easily be moved where wanted. I next designed a very small glue spreader, which was attached to the bench. I made another rigging to hold about 500 glued-up back boards. Instead of employing male help I engaged two ambitious girls. had no trouble in coaching these girls. I watched them very carefully, studied every motion they made and eliminated all unnecessary motions. Within a few weeks the girls would rub joint approximately 600 boards per hour. They could speed up to from 750 to 800 per hour. I did not expect them to do this and was satisfied with results. The girls enjoyed the work and made pretty good wages. Of course, the stock was brought to them and they did not have to handle the pieces after they had been glued and placed into the rigging.

The Automatic Glue Clamper

It is surprising to the man gluing his stock by the old-time method to see the amount of work one or two men can turn out on an automatic glue clamp carrier.

The average furniture manufacturer does not appreciate the value of motion study. Its value in cost reducing cannot be overestimated. Motion study, as a means of increasing output under the military type of management, has consistently proved its usefulness on the work for the past twenty-five years. Its value as a permanent element for standardizing work, and its important place in scientific management, have been appreciated only since observing its standing among the laws of management given to the world by Frederick W. Taylor, the great conservator of scientific investigation, who has done more than all others toward reducing the problem of management to an exact science.

One great trouble in some of the glue rooms is the stubbornness of the man in charge of that department. There are men who will have the stock glued up, regardless of how it is jointed. Question them about it and they will say: "We are employed to glue up stock, not to criticise or do the machine jointing. If the stock comes in imperfectly jointed that is the machine room foreman's headache, not mine. It is my business to turn a certain amount of work out of this department and I'm going to do it. Damaged and imperfect goods? What do I care; that's the old man's loss, not mine."

Time and again I have noticed jointed stock full in the centre and open at both ends. This is another reason why so many joints open up. One will frequently see cabinet-makers try to patch up the open ends, believing that they will improve the looks of the piece. When improperly machine jointed stock is delivered to the glue room, the man in charge should refuse it and report this to the superintendent. It is only a question of a short time when the machine room foreman will see to it that the stock is delivered as it should be and if the operator cannot do proper jointing he will engage a man who can.

The Continuous-Feed Jointer

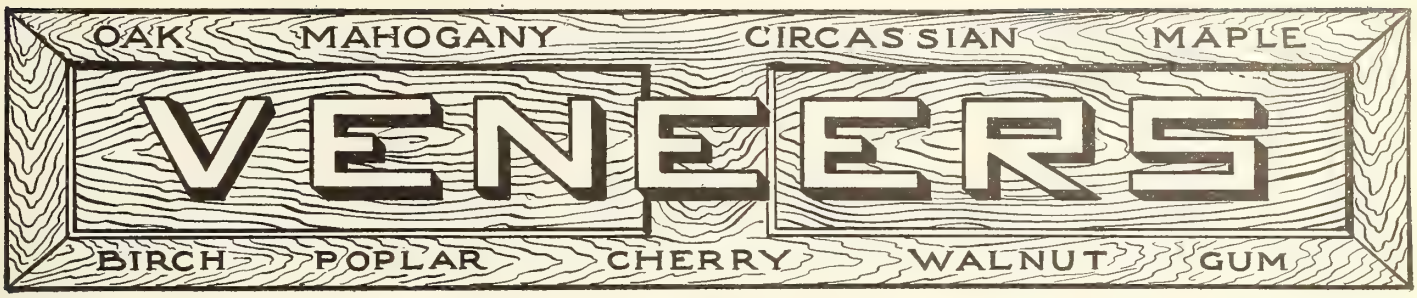
Large capacity, when consistent with quality work, is alwayts desirable in any machine. The continuous-feed glue jointer requires no introduction, but I prefer the machine with adjusting table. There are two reasons why I prefer the adjustable table: First—The output can be increased, for it is possible to vary the cut by simply turning a small hand wheel. Second—One can set the machine to make slack centre glue joints.

The automatic dovetail glue jointer is the most wonderful machine we have in the woodworking line to-day. One great cry I have heard all over the country: "The machine may be all right, but it costs too much money." I cannot understand how a large manufacturer can afford to be without one. From an economical standpoint, it saves lumber and from 40 to 65 per cent. of the glue ordinarily used in joint work.

Again, you have many men handling the lumber, machining, etc., before the stock reaches the glue room. I know of concerns which are saving five men since installing the machine. I wish space would permit my citing some dovetail joint laboratory tests and the efficiency of the machine. However, we must briefly discuss some of the problems of the cabinet room.

Every cabinet-maker should have some knowledge of the rules of mensuration. One great trouble in many cabinet rooms is that the work is done by the old rule-of-thumb methods. It is possible that Grandpa was a cabinet-maker, learned his trade in the old country under some stern "Meister." Those days maker and the son was compelled to learn the same trade. They are all skilled workmen, but we require more than skill in the successful factory. Go to your cabinet-maker and say: "John, I want you to figure the degrees necessary for hexagon, heptagon or octagon shaped table tops, posts or pillars." How many will you find who can do this figuring? If, however, these mitres are not cut correctly it requires a lot of hand fitting and this time costs money. If your cabinet foreman or workman figures the degrees he can turn out his work mathematically correct. There is no fitting necessary. How important this knowledge is, is not appreciated by the average furniture manufacturer.

There are many machine room foremen who, in order to make a showing in their department, unload a lot of misfit work onto the foreman of the cabinet room, and considerable hand work is necessary. All



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We are in a position to quote low prices and make prompt shipments. Stock all well manufactured from selected logs and roller dried.

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C. F. WHISLER

HILLSBORO, OHIO

Manufacturer of

Quartered and Plain Sawed Oak Veneers

Quartered and Plain sawed lumber, any thickness. Also Quartered and Plain Dimension Stock.

Prompt attention given mail orders.
Satisfaction guaranteed.

Goshen Veneer Co.

GOSHEN, INDIANA

Does Experience Count?

¶ We have been making veneers of quality for over fifteen years.

¶ We are sure that our stock, our method of doing business and our prices will more than please you.

Write us to-day for
Poplar and Red Gum Veneers and Crossbanding

Buyers of Veneers and Panels

will find it to their advantage to purchase from the manufacturers and dealers whose advertisements appear in the "Canadian Woodworker." They are progressive firms—the leaders in the business, which is a guarantee of good service and prompt attention to orders.

Give your business to the man who will spend the time and money to get in touch with you. He deserves it—if his stock and prices are right.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

PENROD WALNUT & VENEER CO.

Mills, Kansas City and Helena, Ark.

Send all enquiries to

GENERAL OFFICES - KANSAS CITY, Mo.

Kansas City Plant Exclusively

WALNUT LUMBER AND VENEERS

American and Circassian

Helena Plant Exclusively

Rotary Cut Veneers

Red Gum — Oak
Poplar — Elm
Cypress — Pine

Dry, Flat Stock

Penrod-Jurden-McCowen Lumber Company

Band Mills: Brasfield, Arkansas

Address all enquiries to

SALES OFFICES - KANSAS CITY, MISSOURI

We offer for immediate shipment DRY

RED GUM

Quartered

3 cars	4/4, 1's and 2's	
2 "	5/4	"
1 car	6/4	"
1 "	8/4	"
3 cars	4/4 No. 1 Com.	
1 car	5/4	"
1 "	6/4	"
1 "	8/4	"
1 "	10/4	"

RED GUM

Plain

4 cars	4/4, 1's and 2's	
2 "	5/4	"
1 car	6/4	"
1 "	8/4	"
1 "	10/4	"
2 cars	4/4 No. 1 Com.	
1 car	5/4	"
1 "	6/4	"
1 "	8/4	"
1 "	10/4	"

THE FAMOUS CACHE RIVER GUM

Band Sawn—Flat—Dry

Plain and Quartered Red and White Oak always in stock

We specialize on

Poplar

cross-banding and backing

Veneer

Highest Grade — Right Prices

The largest Poplar Veneer Mill in the world.

The Central Veneer Co.

Huntington, West Virginia

VENEERS

Our Specialty

WISCONSIN - BIRCH - OAK
ASH - ELM - BASSWOOD

All Thicknesses
Log Run or Dimension Stock

PANELS

QUARTERED OAK - QUARTERED GUM
MAHOGANY - WALNUT - BIRCH - ELM
BASSWOOD - YELLOW PINE

All Thicknesses
All Sizes
All Lengths
All Widths

Let us figure with you.

Wisconsin Seating Co.

Manufacturers

NEW LONDON, WISCONSIN, U.S.A.

News of the Trade

The death is recorded of Mr. S. Brubacher, president of the Berlin, Ont., Office & Fixture Company.

The fire at the Rudd Paper Box Company's factory in Toronto last month caused damage estimated at $108,000.

One mill in British Columbia makes 65 tons of pulp daily, and ships it to Japan, South America and other countries.

The Northern Veneer Company, Depot Street, Grimsby, Ont., have awarded a contract for the erection of a basket factory.

The Cameron Lumber Company, Victoria, B.C., recently secured a contract for supplying 4,000 tons of box shooks for the English market.

The sash and door factory at Bordeaux, Que., owned by Messrs. Gingras & David was destroyed by fire last month at a loss of $50,000.

Messrs. W. A. Higgs & Company, Inc., have registered at Montreal. The company will manufacture picture frames, mirrors, and other lines.

The firm of Wise, Gray & Company, wholesale lumber merchants, Hamilton, Ont., has been dissolved, and is succeeded by the Wise Lumber Company.

The Northern Veneer Company, Grimsby, Ont., have awarded to D. March, of the same town, the contract for a basket factory to be erected at Winona.

Wm. Bryant, formerly with Benson & Bray Company, Limited, Midland, Ont., has been appointed superintendent of the woodworking plant of Schultz Bros. & Company, Limited, Brantford, Ont.

Fire started in a hot box of one of the blow fans in the plant of the Superior Sash and Door Factory at New Westminster recently, and destroyed all the buildings and plant, creating damage that will run well over $100,000.

Among the list of newly-incorporated joint stock companies for the Province of Saskatchewan in the last number of the Gazette, appears the name of the Weyburn Lumber Company, Limited, with a capitalization of $20,000.

At Hillsboro', N.B., last month, the woodworking factory owned by the Hillsboro' Woodworking Company was damaged by fire to the extent of $5,000, the loss being $2,000 to machinery and $3,000 to plant. The company will re-build.

The H. & H. Box Company, Limited, has been incorporated in Ontario with head office at Pembroke and an authorized capital of $100,000. The provisional directors are A. J. Thomson, W. S. Morlock and R. C. Berkinshaw, all of Toronto.

The Canada Furniture Company, Woodstock, Ont., who are putting up a $15,000 addition to their factory report that they have stopped work upon it temporarily. The building will be completed in the spring and will be four storeys, 100 x 60 ft.

A report from New Westminster, B.C., states that the Mackie Mill & Mercantile Company intended to commence the erection of their new shingle mill during the third week in January. The plant will have an initial daily capacity of 200,000 feet and will employ about 35 men.

At Woodbridge, Ont., good progress has been made on the addition to the Canada Furniture Manufacturing Company's factory which is being built at a cost of $15,000. The new building, which will be completed in the spring, will be four storeys high, 100 ft. by 60 ft. in dimensions.

With the Royal Bank, Vancouver, as petitioner, winding-up orders were issued by the Court on December 14th in the case of the Cascade Mills, Limited, and the Terminal Lumber & Shingle Company, Limited, the Liquidator appointed in each instance being the Montreal Trust Company.

The Gulf Pulp and Lumber Company, Limited, has been incorporated at Ottawa. Its head office will be at Montreal, and it will be capitalized at $250,000. Frederick E. Ritchie, lumber merchant, of Montreal, is one of the incorporators. The company will carry on a general lumber, pulp and paper business.

At Cranbrook, B.C., operations are to be commenced this spring on the erection of a wood distillation plant estimated to cost $20,000. The plant will be for the distillation of pine stumps into various by-products. The architect, who is acting in trust for the owner, is Mr. H. S. Moore, of Blairmore, Alberta.

The Doukhobour colony at Brilliant in the Nelson district recently purchased machinery at the Coast for a box factory, and secured data relative to the cost of a sash and door plant. The Doukhobours already operate a couple of small sawmills, which can be utilized in getting out stock for both plants.

The Erie Lumber Company, Limited, has been registered in British Columbia as an extra-Provincial company. The head office of the company is at Cambridge, Minn., and the provincial head office at Nelson, B.C. Mr. C. R. Hamilton, Nelson, is attorney for the company. The capital of the company is $200,000.

The Wilson Box Company, Limited, St. John, N.B., have recently completed a new sawmill at Bonny River, Charlotte County, N.B., where they have important timber interests and where they intend to saw box boards chiefly. These boards will go to their plant at Fairville, N.B., over the Shore Line Branch of the C. P. R.

C. Allison Peck, Hillsboro', N.B., is considering the purchase of a hardwood flooring plant at that point. He will equip the plant with woodworking machinery to replace a plant which was recently destroyed by fire. A new engine to run a rotary sawmill will be purhcased, also various parts of machinery which were destroyed.

Mr. J. E. Alain has been re-elected Mayor of Victoriaville, P.Q. He is managing director of the Victoriaville Furniture Company, vice-president of the Canadian Rattan Chair Company, and director of the Victoriaville Chair Manufacturing Company. He is also vice-president of the School Commission and a member of the executive committee of the Manufacturers' Association.

British Columbia mills are now tendering on one of the largest lumber contracts ever opened for world-wide competition. Through the British Government the Chamber of Deputies of France has asked for the supply of 500,000,000 feet of lumber to be used in the construction of 100,000 two-roomed houses. These small homes are to house that section of France's population which has lost its all through the ravages of war. Owing to the fact that the French Government will want the lumber as early as possible it will most likely mean that the firm which secures the contract will have to let sub-contracts.

The British Government Board of Trade has at the moment an exhibition of furniture, established with a view to competing with continental and other manufacturers. English manufacturers have already devised substitutes for a class of furniture heretofore exported from Austria, and it is hoped to capture some of this trade. The trade in Austrian bent-wood furniture alone is estimated to be worth between $4,000,000 and $5,000,000, and of this about $176,000 is sent to the United Kingdom, and even far away Australia buys $32,000

We are prepared to quote close prices on

Plain Quarter-cut Oak, Mahogany, Birch, Etc.

both from Toronto stock and for quick delivery from the mills in the different thicknesses and sizes. Our Oak includes both American and English manufacture.

We have a small assortment of ALDERLITE in 3/16″ and 1/4″ in large sheets which we can ship immediately.

C. DUPRE & CO., 266-8 King Street West, TORONTO
Sole Agents, Venesta Limited, London, England

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Patents taken through Munn & Co. receive *special notice*, without charge, in the

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A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms for Canada, $3.75 a year, postage prepaid. Sold by all newsdealers.

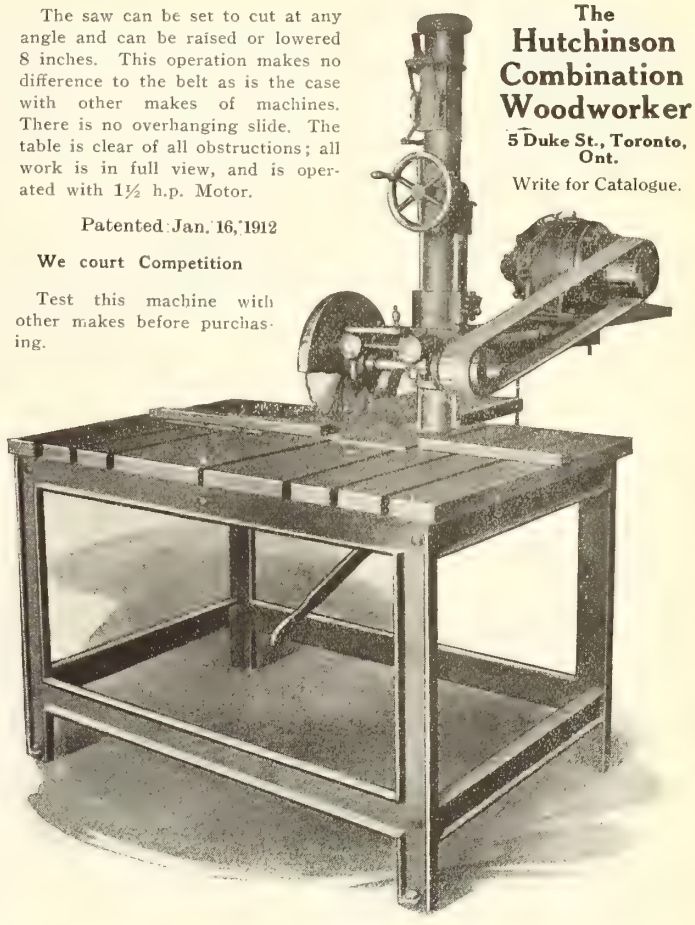
MUNN & Co. 363 Broadway, **New York**
Branch Office, 625 F St., Washington, D. C.

The saw can be set to cut at any angle and can be raised or lowered 8 inches. This operation makes no difference to the belt as is the case with other makes of machines. There is no overhanging slide. The table is clear of all obstructions; all work is in full view, and is operated with 1½ h.p. Motor.

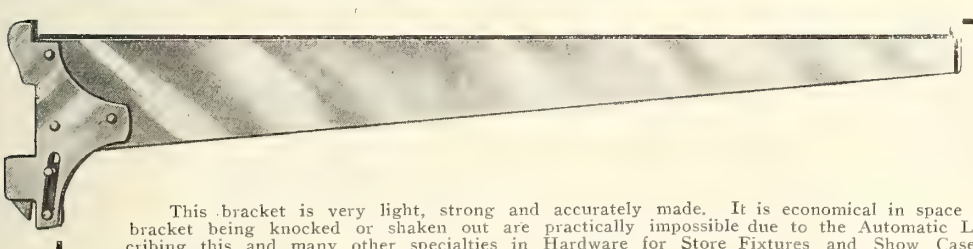
Patented Jan. 16, 1912

We court Competition

Test this machine with other makes before purchasing.



The
Hutchinson Combination Woodworker
5 Duke St., Toronto, Ont.
Write for Catalogue.



ADJUSTABLE BRACKETS

This bracket is very light, strong and accurately made. It is economical in space and beautifully finished. Accidents from bracket being knocked or shaken out are practically impossible due to the Automatic Locking Device. Send for catalogue describing this and many other specialties in Hardware for Store Fixtures and Show Case manufacturers.

The Reflector & Hardware Specialty Mfg. Co.

Western Ave. and Twenty-Second St. - - - CHICAGO, ILL.

worth a year. German furniture to the amount of over $110,000 has heretofore been imported annually into the United Kingdom

Business Notes

The following inquiries relating to Canadian trade have been received. The names of the firms making these inquiries, with their addresses, can be obtained by those specially interested upon application to "The Inquiries' Branch, Department of Trade and Commerce, Ottawa." Inquirers should quote reference number when requesting addresses.

186. **Woodworking machinery.**—A Japanese firm in Tokio wishes to get into communication with manufacturers and exporters of woodworking machinery in Canada, and to receive catalogues from same.

202. **Box shooks.**—Quotations are asked for fruit boxes, not less than 50,000 wanted, which must be made from clear white pine. Box 18 by 12; tops and bottoms, 5½ wide by ¼; ends, ⅝; depths, 2, 2¼, 2½, 2¾, 3, 4, 5, 6, by ¼.

203. **Box shooks.**—Quotations are asked on 50,000 boxes, which must be made from clear white pine. The actual sizes wanted are : 8 pieces 26 by 5½ by ¼, 3 pieces 12 by 12 by ⅜, 2 pieces 11½ by ¾ by ⅜. Further particulars of an alternative box are on file at the Department of Trade and Commerce.

204. **Agency in South Africa.**—A manufacturers' agent covering all centres of South Africa is prepared to take up agency for the following articles of Canadian manufacture: chairs, folding chairs, furniture, tables, handles, hardware specialties, household hardware, general hardware, shovels, axes, lanterns, hubs, spokes, rims, wheels, paints and varnish, hard carts, wheel-barrows, and step-ladders.

235. **South African agency.**—A South African firm of commission agents with travellers covering all centres asks for immediate correspondence, with illustrated catalogues and full information re agency for the following: chairs, tables, Cardigan jackets, veneer (3-ply oak, quotations f.o.b. Montreal or St. John), veneer (3-ply walnut), military barrels (suitable for transport wagon, holding 5 to 15 gallons, made of spruce or oak with mouthpiece and handle for hanging), organs, woodenware, step-ladders, wooden buckets, and handles.

237. **South African agency.**—A South African commission agent covering the whole of South Africa with subagents in the principal centres, requests correspondence for agency in Canadian furniture, folding chairs, pianos, and organs.

268. **Wheelbarrows.**—An agent in Paris wishes to receive quotations and catalogues from manufacturers of wheelbarrows.

Buy Your Glue Right

IT would seem a trite expression to say that nothing is more important to the woodworker and the furniture manufacturer than the quality of the glue used in putting his goods together. There is no article used in the woodworking industry which fills a more important place than glue. What is the use of buying expensive and selected lumber, new and expensive machinery, and employing high grade workmen, unless you get a glue from a manufacturer who can supply a high grade and uniform article, which you know is going to hold your work after you have given it all the care and attention to put it together? Once the woodworker has established a standard, he wants to feel assured that he can draw a fresh supply which will meet his requirements.

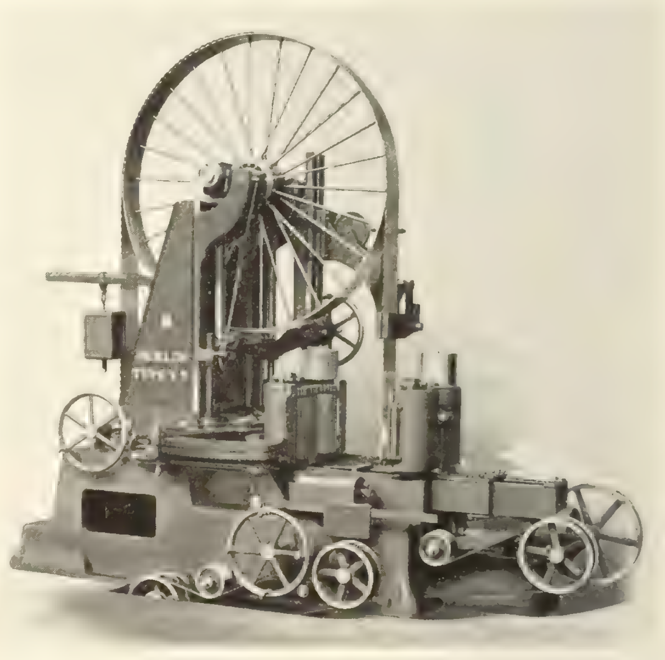
With these points in view, the Canada Glue Company, Limited, has rebuilt the plant at Brantford destroyed by fire on May 9th, 1914. The new plant is thoroughly up-to-date, with modern equipment and business methods.

The Canada Glue Company commands a thorough knowledge of the glue-making business. It has made a constant study of the needs of the trade, and it stands for uniformity of product and prompt deliveries.

The main office and factory of the company are at Brantford, with a branch office at 48 Front Street East, Toronto, in charge of Messrs. J. S. Donaldson & Company, and a branch office and warehouse at 224 Lemoine Street, Montreal, in charge of Mr. B. W. Stiles. A fully-equipped laboratory is maintained for testing and experimental purposes, and any of our readers having glue troubles are invited to avail themselves of this facility.

New "Made-in-Canada" Saw Mill Resaw

The vertical resaw shown here is the late production of the Berlin Machine Works Limited, Hamilton, Ont., one of the foremost concerns building band sawing machinery. It is holding the attention of Canadian lumbermen, not alone because it is the product of this well-known firm, or because it is specifically a "made-in-Canada" machine, but because in the proving up it has been given during the last year it has established a reputation for capacity, accuracy of manufacture and endurance that leave no question as to its exceptional efficiency. This is due to the firm's thorough knowledge of Canadian lumber manufacturing conditions and to the simplicity, stability and strength which has been embodied in the design of the machine. While in resaws of this type a one-piece base is not entirely unusual, it is a question if any resaw built to-day, carrying the same size wheels, has so heavy a base as this machine. The heavy one-piece columns and long cross-heads supporting the all-steel light wheel provide stability, also.



The Berlin Vertical Resaw.

While lumbermen and band resaw users in general have long felt that standardization in design and operating devices of the various size resaws built by any one concern would prove advantageous, it has remained with the makers of this machine to carry out the idea completely. The resaw shown here carries 7-foot wheels, and identically the same machine is also built in 64-inch, 6-foot and 8-foot wheel sizes—of the same design and operating features. On the two smaller sizes the maximum roll opening is 20 inches and

The Product of a New and Up-to-Date Factory

On May 9th, 1914, the main portion of our factory was destroyed by fire.

Like a Phoenix rising from the ashes our new plant stands to-day second to none, in point of equipment, on the whole American continent.

The good features of the old factory have been re-adopted and improvements made, with the result that our glues are made **right** and sold at **right prices.**

Brantford Glue is like a tried and true friend—it sticks.

Canada Glue Company, Limited

LLOYD HARRIS, President

BRANTFORD, - ONTARIO

Toronto Representative:
J. S. DONALDSON & CO., 48 Front St. E.

Montreal Branch:
224 Lemoine St.—B. W. STILES

MADE IN CANADA

MOREHEAD

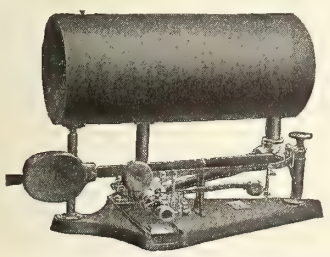
Back to Boiler SYSTEM

MADE IN CANADA

Direct Boiler Feeding

The "Morehead" Way

The Morehead "Back-to-Boiler" System—now saving thousands of dollars in a number of the country's largest plants—picks up every drop of condensation and returns it into the boiler at its initial temperature. It automatically keeps every inch of heating surface in your steam system active—handles water at any temperature without sticking or racing—feeds boilers the condensation **hot** 290 to 330 degrees Fahr.—**ready for re-use.** Pumps can't handle water above 212 degrees Fahr.—and every **ten degrees** in heat saves **one per cent.** in coal. Can you figure the saving over the old pump-return method? Worth considering, isn't it?

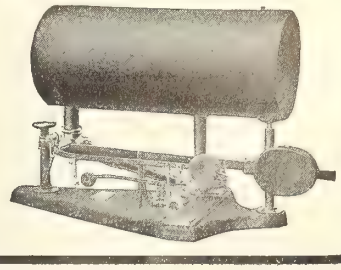


Learn why this System is endorsed by so many big plants. Write our engineers, stating conditions in YOUR plant and let them assist you in bettering YOUR steam system. If it's worth a postage stamp for the information—WRITE TODAY.

Canadian-Morehead Mfg. Co., Ltd.

Department "H"

WOODSTOCK, - ONTARIO



197

Lumber Salesman

A United States hardwood firm wants to get in touch with a live salesman to sell hardwoods on commission.. If you can get the trade, send full particulars to Box 42, Canadian Woodworker, Toronto. 2

Veneer and Hardwood Salesman Wanted

A high-grade hardwood salesman who is thoroughly acquainted with the furniture, piano and interior finish trade of Canada. We can offer such a man an exclusive territory in a well established line. Send full particulars and references. Address Box 43, Canadian Woodworker, 345 Adelaide Street West, Toronto, Ont. 2

Bright, Energetic Young Man

Woodworker, expert on veneering and veneered work, first-class draughtsman, thoroughly understands taking off quantities, and estimating from blue prints; capable of taking charge of woodworking plant or acting as assistant superintendent with same. The sphere in which I find myself at present is too limited. I can either refer you to my present employer for a personal interview or secure a reference from him. Box 41, Canadian Woodworker, Toronto, Ont. 2

For Sale

Cabinet Machinery consisting of gang dovetail, No. 3 Waymouth lathe, saw tables, Rogers moulder, Boult carver, White shaper, etc. J. L. Lucas & Son, 3 Fox Street, Bridgeport, Conn. 12-1

Sale By Tender

The undersigned has been instructed to offer for sale the following:

Parcel 1.—The land and premises, in all one-half acre more or less, the whole being the property of the Salyerds Manufacturing Company, Limited, Insolvent, Preston, Ont.

Parcel 2.—One of the most complete plants, machinery, implements, utensils and effects in Canada for the manufacture of furniture, sporting goods, hockey sticks, brushes and wood specialties, being the property of the Salyerds Manufacturing Company, Limited, Insolvent.

Parcel 3.—A large stock of unmanufactured lumber, being the property of the above-named Company.

Parcel 4.—Stock of manufactured products, including hockey sticks, brushes, etc., being the property of the above-named Company.

Tenders for the above will be received by the undersigned up till noon of

Monday, March 1st, 1915

Tenders may be put in for all of the parcels or separate tenders may be put in for each parcel. Each tender must be accompanied by a marked cheque for five per cent. (5%) of the amount of the tender. A further sum equal to ten per cent. (10%) of the amount of the tender shall be payable on acceptance thereof. The balance of the purchase price shall be payable on or before March 20th, 1915, when the sale is to be closed. The highest or any tender will not necessarily be accepted.

For further particulars and terms and conditions of sale apply to the undersigned.

HARRY C. EDGAR,
Assignee for the Benefit of Creditors of the Salyerds Manufacturing Co., Ltd., Preston, Ontario.
Preston, Ontario.

7% INVESTMENT 7% PROFIT SHARING

Sums of $100, $500, $1000 and up. Safe as any mortgage.
Business at back of this Security established 28 years.
Send for special folder to

National Securities Corporation, Ltd., Confed. Life Bldg. TORONTO

on the two larger machines, 24 inches. The rolls open an equal distance on each side of the saw, or they may be arranged to open a quarter of their maximum opening on one side and three-quarters on the other side, or any similar arrangement. The double lever set works, one of the machine's big features, may be positioned on either side of the saw, and as the resaw in any size is built right and left hand, it will be seen that the machine will readily fit in with the existing arrangement of the average Canadian mill.

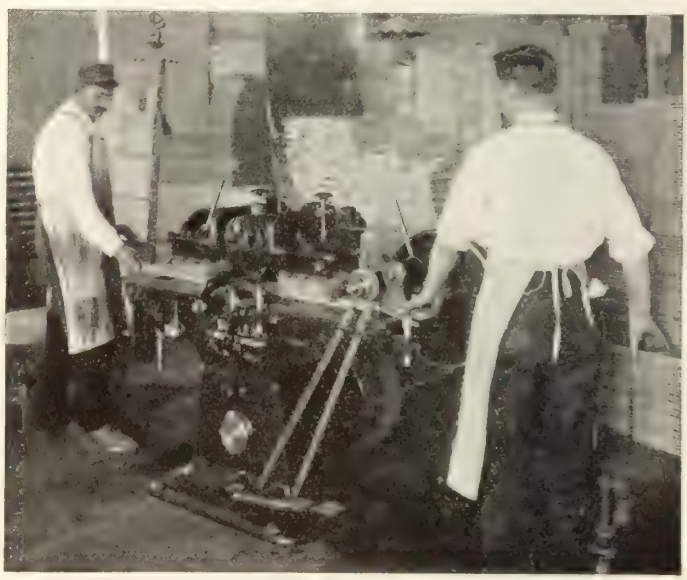
Sawmill capacity may be increased by assisting the head rig with one of these resaws, or two may be employed which in the average two-band mill should effect an increase in capacity of approximately 60 per cent. At the same time a decrease in producing costs is obtained, as lumber can be manufactured at a lower cost on this resaw than on any head rig.

Recently, in a western mill, one of these 7-foot machines resawed 147 M. feet of lumber B.M. in ten hours. On the narrower material the feed was raised to 250 feet a minute. One could almost accept this as a record. Yet the owners of the machine say confidently that if their facilities for getting material to and away from it were more active an average daily capacity of 150 M. feet could be maintained easily.

The Berlin Machine Works, Limited, have recently issued a booklet fully illustrating and describing this new series of sawmill resaws.

The Duplex Moulding Sander

The accompanying illustration shows a Duplex moulding sander operating on office furniture. This machine will sand short as well as long mouldings, from the smallest up to those eight inches in width. It is the only machine for

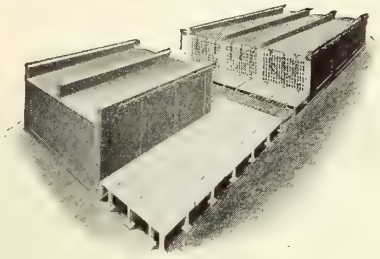


The Duplex Moulding Sander.

sanding fine line mouldings and trim, and it is manufactured by The Duplex Moulding Sander Company, Inc., Hornell, N.Y.

A number of New Westminster Hindoos have formed a joint stock company, with a capitalization of $250,000, and will engage in the importing of teak, ebony and other valuable hardwoods from their native land—the Punjab Valley of India. Their plan is to establish a sawmilling plant there, ship the squared timber to British Columbia in cargo lots, and manufacture it further at New Westminster, when the finished lumber will be worth $300 per thousand feet.

MORTON HUMIDITY SYSTEM POCKET KILNS



This is the ideal type of kiln for any firm that has numerous kinds and thicknesses of lumber to dry.

Perfect Control
and
Rapid Results
build a kiln that fits your special requirements.

Write for our 3 Complete Catalogs and Special Folder-60 F.

MORTON DRY KILN CO., 20 W. Jackson Blvd. CHICAGO, ILL.

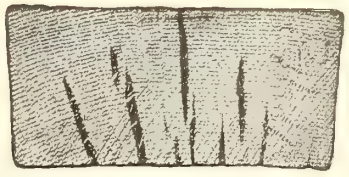
Every kind and form of

DRYING LUMBER

Grand Rapids Dry Kiln

QUALITY DRYING

Grand Rapids
Mich. - U. S. A.



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"ANDREWS" Products Represent Perfection—Reliability—Results

"Andrews" Moist Air Lumber Driers

CONDENSING
or
VENTILATED

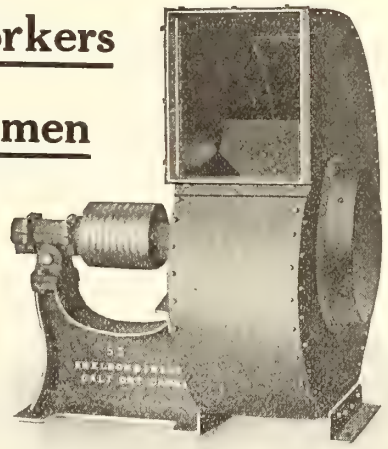
Perfect Transfer Cars
Perfect Dry Kiln Trucks
Canvas Dry Kiln Doors
Double and Single

Write for Information

DRIER DEPARTMENT

The A. H. Andrews Co.
115-117 South Wabash Ave.
CHICAGO

Woodworkers and Lumbermen



The Sheldon Exhaust Fans have characteristics that adapt themselves to the service of the Planing Mill or Woodworking Plant. They are specially designed for this kind of work, having a saving in power and speed of 25% to 40%.

Write for Industrial Booklet.

SHELDONS LIMITED - Galt, Ont.

Toronto Office, 609 Kent Building

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Messrs. Ross & Greig, 412 St. James St., Montreal, Que.
Messrs. Walker's Limited, 259-261 Stanley St., Winnipeg, Man.
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Messrs. Robt. Hamilton & Co., Ltd., Bk. of Ottawa Bldg, Vancouver, B.C.

Plain Sawed Oak

Mills in West Virginia and Kentucky

Wilcox & Knapp

Conneautville, Pa.

Quotations Cheerfully Furnished

A New Year's Resolution

I shall carry my patriotism into my business, and so conduct it that every transaction shall, as far as possible, contribute to the upbuilding of natural resources.

C. A. SPENCER

Softwood and Hardwood Lumber

603 Eastern Townships Bank Building,
MONTREAL

The Atlantic Lumber Co.

Manufacturers and Wholesale Dealers

American and Canadian Hardwood Lumber and Mahogany, Quartered and Plain, White and Red Oak a Specialty.

110 Manning Chambers - **TORONTO**
Phone Main 6386

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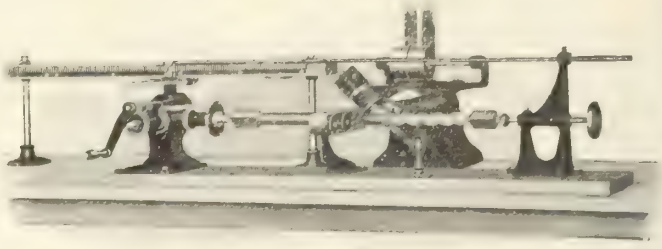
Mills: KNOXVILLE, TENN., WALLAND, TENN.
FRANKLIN, VA.

Twist Machine



This machine will produce twist and spiral Columns, Balusters, Table Legs and Pedestals, Chair Posts and Spindles, etc., right and left turn.

The cutter used on this machine is in two parts; the cutting edges on each half are milled angular, giving a shear-cut effect.

The dividing plates will space 2, 3, 4, 6 and 8-in. Special plates furnished on application.

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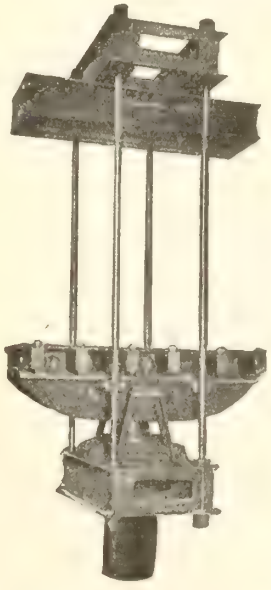

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For Alphabetical Index see page 4

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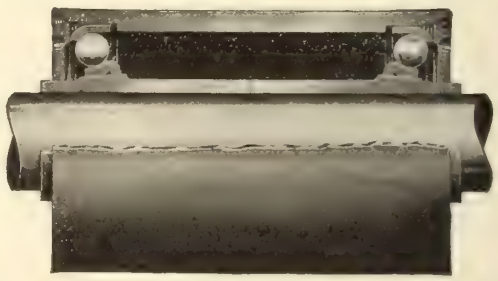

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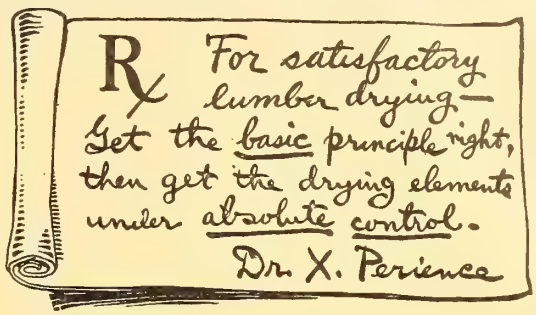

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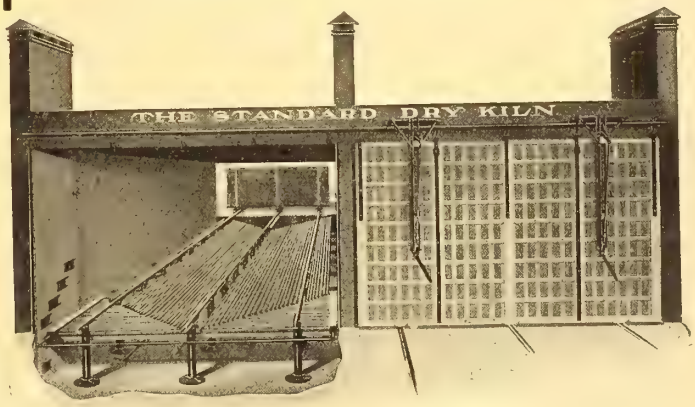

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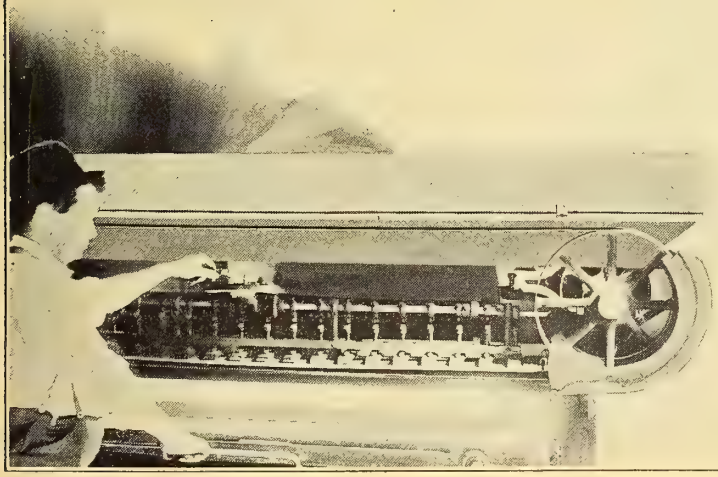


For real sanding service—for clean, fast cutting, uniformity of finish and long life use Carborundum Brand Garnet Cloth. Put it on your belt sanders, it will hold its shape, hold its grain, cut fast, and every inch of the cloth is uniformly coated with hard, sharp, clean Garnet grain. Carborundum Brand Garnet Products are made right and of the best quality of materials.

Send for working samples

The Carborundum Company
Niagara Falls, N. Y.
New York Chicago Boston Grand Rapids Philadelphia
Cleveland Pittsburgh Cincinnati Milwaukee
Reisholz, Ger. Manchester, Eng.

BEST RESULTS IN THE FINISHING ROOM

You may get them by using the best stains it is possible to buy—

Marietta
Spartan Art
Wood Stains

The stains that possess all the artistic possibilities, yet are thoroughly practical.

Two of our latest successes are our

Non-Fading Mahogany Stain
and our
Spartanite
"Always White" White Enamel

NOTE—We can still supply Fumed Oak Acid Stains and Unifume regardless of the European War.

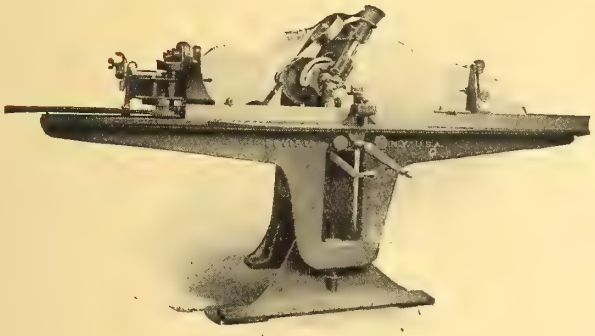
Marietta Paint & Color Co.
MARIETTA, OHIO

CANADIAN WOODWORKER and Furniture Manufacturer

Fluting and Twist Machine

(Patented)

The Result of Fifty Years' Experience

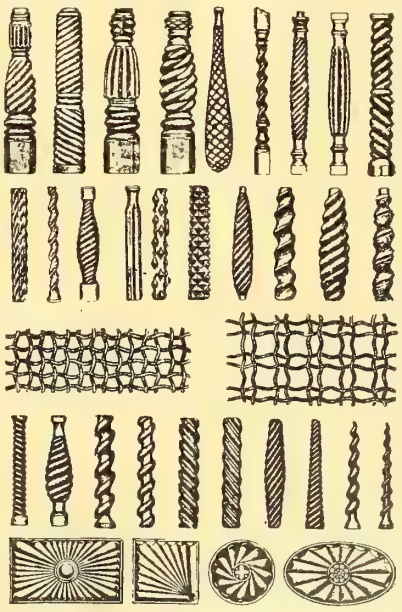


This machine will produce all kinds of spiral or rope mouldings, either straight, tapered, curved or oval. It will make right, left, and pineapple cuts, and will do straight, and irregular fluting. It will cut from one to six threads on a piece, and will make any degree of twist from one turn in one and one-half inches of length to one in ten and one-half inches.

The cutters are similar in shape and arrangement to those used on variety shapers, and are made of the same steel. They revolve always in the same direction, whether the twist be right or left, and one set will produce several different shapes of work. Changing from one degree of twist to another, or from right to left, takes less than one minute. This machine will swing eight inches, and will take 5 feet to 10 feet between centres, according to length ordered.

A Medallion Fluting Attachment will produce radial fluting on flat work up to 9 inches square, or 6 x 12 oblong. This fluting can be either perfectly flat or can be swelled or waved. It can run direct to the centre or tangent to a central circle.

The same cutters are used as for the twist work.



If interested in Woodworking Machinery, write us.

P. Pryibil Machine Co.

512-24 W. 41st. St.
New York City

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"Leather like gold has no substitute."

No Power Leaks

FROM

"CROWN" Planer Belting

The big expense in your plant is the power, so when you have spent your good money to generate it, don't make the common mistake of buying a cheap, inefficient belt to transmit it.

Use "Crown" Planer Belting and you will find it grips the pulleys and transmits 100% of your power. It is made for high speed heavy duty and will take short bends over small pulleys without starting any laps.

We have been manufacturing leather belting since 1876.

Send us an order for one belt.

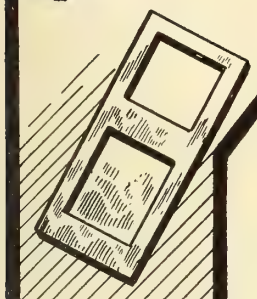
Made in Canada

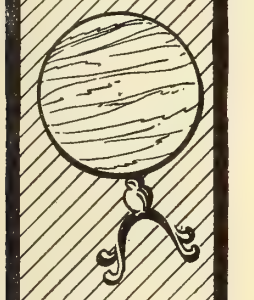
Sadler & Haworth

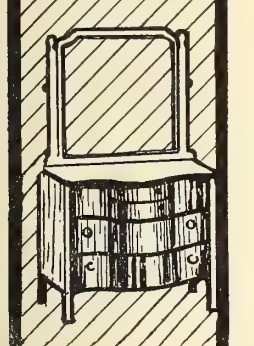
Tanners and Manufacturers

Toronto	St. John, N.B.	MONTREAL	Winnipeg	Vancouver
38 Wellington St. E.	149 Prince William St.	511 William St.	Galt Building	217 Columbia Ave.

Glue Room Economy







When You Use

Perkins Vegetable Glue

You will have

Perkins Quality - Absolutely Uniform

In your glue room

No heat for application
No offensive odor
No hot cauls
Comfortable temperature
No waste glue
Absolute uniformity
A big saving in cost

In your product

Veneers laid to stay
Unaffected by climate
No blisters from standing
Will stand ocean voyage
Dependable results
Highest quality
Repeat orders

We prove it in your own factory

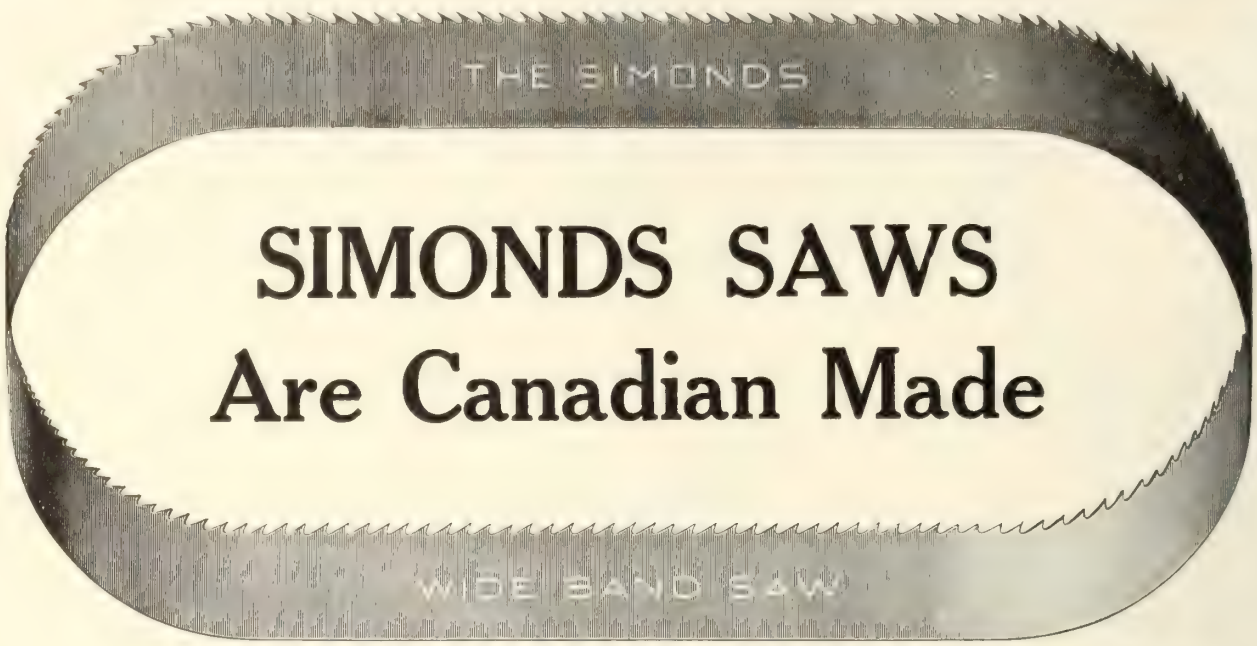
Our Canadian representative will call and explain our proposition

Perkins Glue Company

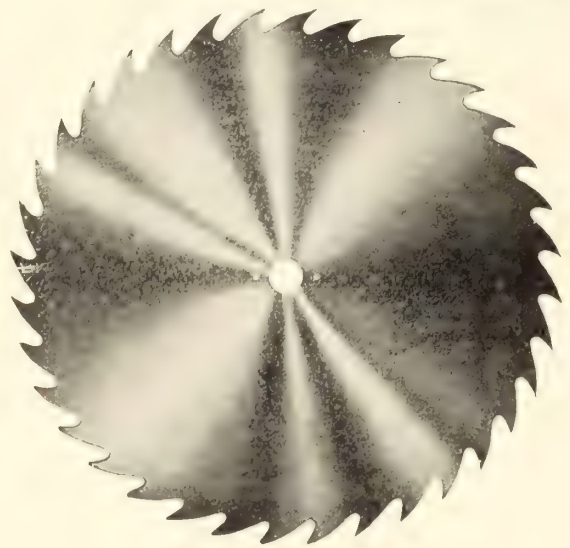
Originator and Patentee of Vegetable Glue

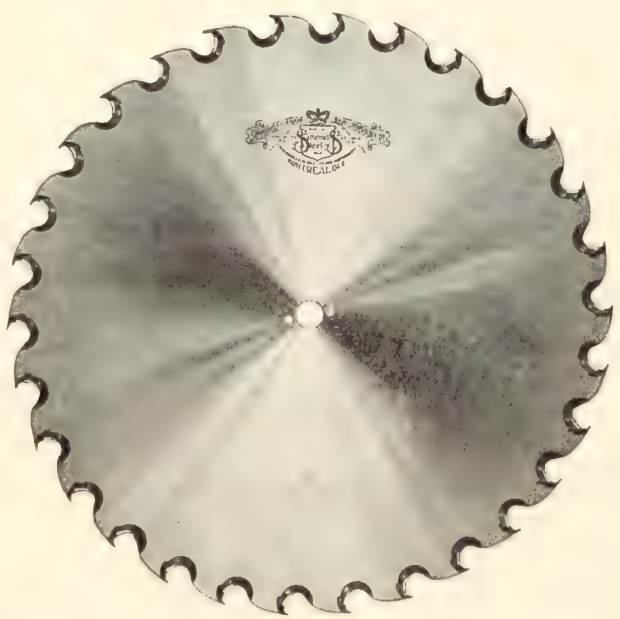
Suite 809 J.M.S. Bldg. - South Bend, Indiana

Perkins Glue



SIMONDS SAWS
Are Canadian Made





Principal Factory in Montreal. Shops in St. John and Vancouver.

Just added to our Montreal plant a very large three-storey substantial brick building, almost doubling the plant's capacity.

That's what we do for Canada.

These facts, together with our well-known reputation for furnishing highest quality goods entitle us to be called upon by you to supply your saws or woodworking machine knives of any size or description.

Our aim is to combine Canadian workmanship, high quality, honest prices and quick service.

Let us hear from you.

Simonds Canada Saw Co.
Limited
Montreal
Vancouver, B. C. St. John, N. B.

The Machine that Gets Out the Work For Nearly a Thousand Plants

To speed up output and thus to reduce cost of production—

—or simply to produce the same quantities as at present and obtain better work, with no loss of stock in manufacture—

—or both to increase output, and obtain better moulder work at a very much reduced cost—

There are your reasons for installing a Berlin No. 108 Moulder with Hopper Feed;

—but that does not sum up the total advantage of having so capable a moulder in your plant as the No. 108 Berlin.

One of the great differences between using a capable moulder and the highly specialized "sticker" is that the sticker's work is confined to a very limited quantity and a very limited variety of moulder work, while—

—the No. 108 Moulder is capable of producing the finest work at three times the speed of the sticker, and—

—the variety of work that may be done on the No. 108, with modern moulder cutterhead equipment, is practically unlimited.

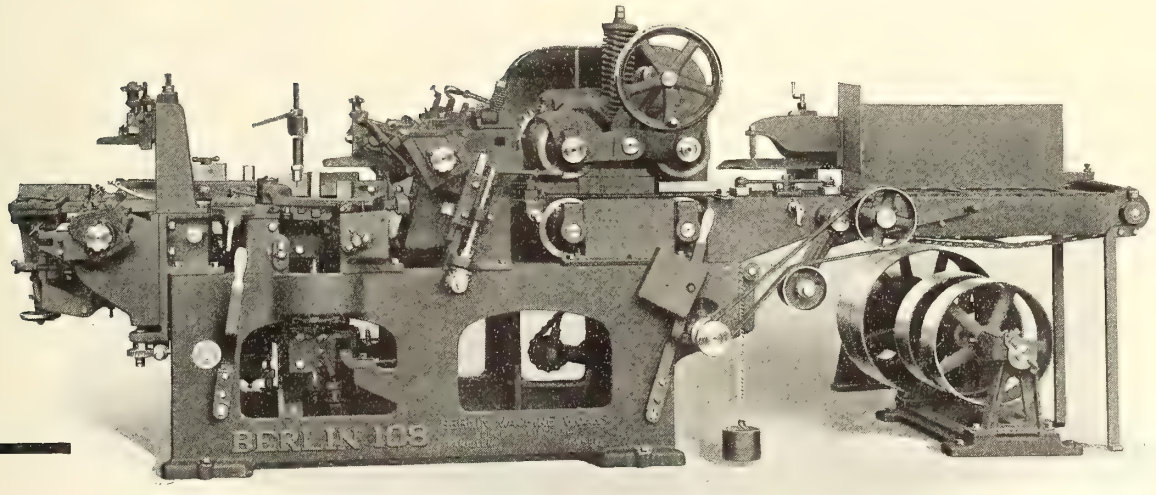
The illustration below shows a No. 108 with Hopper Feed for short stock. It is an ideal furniture factory tool so equipped.

Will you investigate this machine at our expense?

BERLIN MACHINE WORKS, LTD.

Largest Manufacturers of Woodworking Machinery in the World

HAMILTON, ONT. BELOIT, WIS., U. S. A.



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BOOKS FOR SALE

The following books are offered at special prices subject to previous sale:

Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York, 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

The Book of Lumber Shed Construction, by Met. L. Saley. Published by American Lumberman, Chicago. 176 pages, illustrated. Price $1.00.

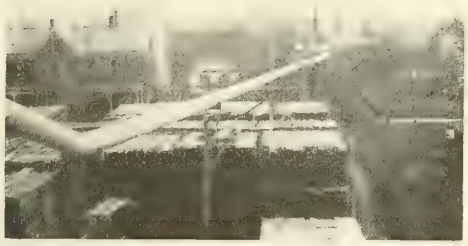
Popular Mechanics Shop Notes, Published by Popular Mechanics, Chicago. Easy Ways to do Hard Things, etc. Years 1905-1906-1907-1908. Price 40c each.

Cabinet Making, by J. H. Rudd. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

345 Adelaide Street West, Toronto, Ontario

Slow Speed Low Power Shaving and Dust Collecting Systems



New Systems designed. Old systems corrected.
Long distance blows a specialty.

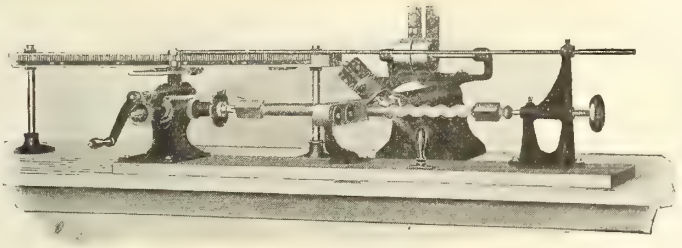
Trained Mechanics. We know how.

Consult our Expert

INVINCIBLE BLOW PIPE CO.

CHICAGO **176 George St., TORONTO**

Twist Machine



This machine will produce twist and spiral Columns, Balusters, Table Legs and Pedestals, Chair Posts and Spindles, etc., right and left turn.

The cutter used on this machine is in two parts; the cutting edges on each half are milled angular, giving a shear-cut effect.

The dividing plates will space 2, 3, 4, 6 and 8-in. Special plates furnished on application.

The feed gear set gives one turn in 1½, 3, 4½, 6, 7½ and 9-in.

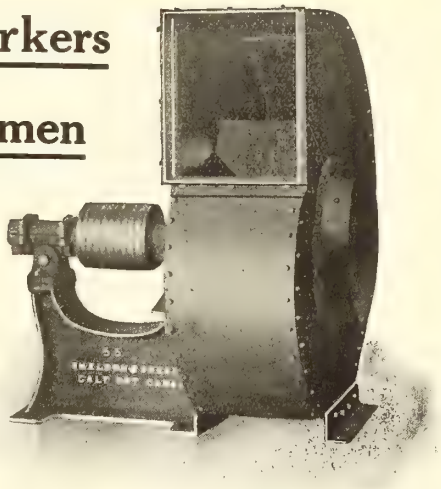
The centers will swing any diameter up to 12-in. Length, 4, 6, 8 and 10-ft.

For prices and further description write

The Shawver Company

Springfield, Ohio

Woodworkers and Lumbermen



The Sheldon Exhaust Fans have characteristics that adapt themselves to the service of the Planing Mill or Woodworking Plant. They are specially designed for this kind of work, having a saving in power and speed of 25% to 40%.

Write for Industrial Booklet.

SHELDONS LIMITED - Galt, Ont.

Toronto Office, 609 Kent Building

— Agents —

Messrs. Ross & Greig, 412 St. James St., Montreal, Que.
Messrs. Walker's Limited, 259-261 Stanley St., Winnipeg, Man.
Messrs Gorman, Clancey & Grindley Ltd., Calgary and Edmonton, Alta.
Messrs. Robt. Hamilton & Co., Ltd., Bk. of Ottawa Bldg, Vancouver, B.C.

Good Steel, Carefully Manufactured, Scientifically Tempered

Our **GLUE JOINT CUTTERS** Make a Perfect Joint.

MILLED SHAPER CUTTERS—Any Size or Any Shape. Ask for quotations.

GALT KNIFE COMPANY, LIMITED **99 State Street, Galt, Ontario**

Chas. F. Luehrmann Hardwood Lumber Co.

148 Carroll Street

ST. LOUIS, MO.

Manufacturers of the original

St. Francis Basin Gum

We have on hand a complete stock of Red Gum and Unselected Gum, in thicknesses from 1″ to 3″. Nice dry stock of 1″ to 2″ Quartered Red Gum.

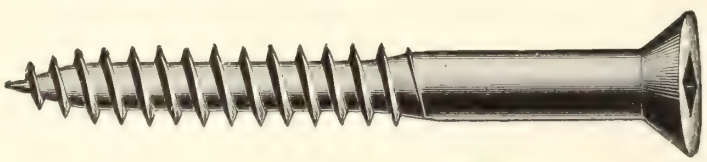
We also carry a complete stock of Oak, Quartered and Plain, Red and White, 1″ to 5″ thick, and large stocks of Ash, soft Maple, soft Elm, Cypress, Yellow Pine and Cottonwood.

We make a specialty of Yellow Pine Structural Timber, and can furnish either Long Leaf or Short Leaf.

We carry a full and complete stock of all kinds of Veneers, in Red Gum, Mahogany, Oak, Poplar, Yellow Pine and Birch.

ROBERTSON SOCKET HEAD

Wood Screws



See That Square Hole

Pat. Feb. 2, 1909

THIS IS A REAL WOOD SCREW

It is driven by a simple square bit, and is the only one of its type on the market. Driver fits snugly into the square hole and positively cannot slip and cut the fingers, or disfigure costly furniture or woodwork. It is driven with less exertion. No ragged slots after driving. Saves time, labor, money and material. We make the drivers in all suitable styles.

Drivers sent free with first order. Write for catalogue and prices.

P. L. Robertson Mfg. Co., Limited

MILTON :: ONTARIO

Canadian Woodworker

**A Monthly Publication in the Interest of the Woodworking Industry.
Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.**

Subscription, $1.00 a year; foreign $1.50.

Woodworker Publishing Company, Limited

Branches: Montreal, Vancouver, Chicago, New York, London, Eng.

345 Adelaide St. West, Toronto
Phone Ade. 2700

Authorized by the Postmaster General for Canada, for transmission as second class matter.
Entered as second class matter July 18th, 1914, at the Post Office at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 15 **March, 1915** **No. 3**

The Limitations of the Made-in-Canada Movement—The Canadian Woodworker Endorsed

OF a number of comments, writen and spoken, regarding the editorial article on the "Made-in-Canada" movement published in our last issue, one of the most outspoken is a letter from which the following extract is taken:

> "We wish to congratulate you upon the editorial article in your February issue. You have hit the nail on the head.
>
> "Some of your contemporaries are running wild on the "made-in-Canada" slogan. If their policies were put into effect Canada would soon find itself isolated from the outside world, and the consumer would have to pay an extremely high price for everything that he used. This would operate to the advantage of only a few manufacturers. We have given considerable thought to recent developments and present conditions, and we think that a few more editorials such as appeared in the February Woodworker would accomplish a great deal."

The article in question constituted a plea for establishing Canadian manufactures in the pre-eminent position not by protective tariffs but by quality and price. At the risk of reiteration, we would emphasize the point that neither the woodworking trade in Canada nor any other branch of industry in this country can be benefited by so-called protective measures which seek to close the Canadian market to outside competition. Canada first, and Canada last—but competition always, if we are ever to become a factor worth considering in the industrial world.

* * *

Not Quite the Proper Viewpoint

ANOTHER of our readers, the manager of an Ontario furniture manufacturing concern, writes us in regard to the "Made-in-Canada" movement. He is of the opinion that much can be accomplished by individual effort exerted in a common plane. The trouble of it is, he says, that everybody thinks that trade revival must necessarily come about as a natural condition.

"So it must," he writes, "but natural conditions can be improved. For our own part, we have had two of our local papers insert the slogan 'Buy a Piece of Canadian Furniture.' We secured a great many extra copies, marked them, and mailed them to the farmers in our locality. If the same idea were followed up by all furniture manufacturers and retail dealers, there is not the slightest doubt that he furniture trade would feel the stimulus. Whatever can be said against the 'Made-in-Canada' idea, there can be little doubt that the industrial activities of the country will benefit materially from it."

To our mind this is an exemplification of its not paying to advertise. Advertising, to be effective, must be strong and forceful, bringing out some central idea or ideas likely to make an impression upon the reader's mind. The intelligent reader would not be influenced by the bold slogan which our correspondent inserted in his local paper; rather would he come to the conclusion that the Canadian furniture trade must be in hard straits when it had to resort to such a method of appealing to Canadian sentiment.

* * *

What Effective Publicity Means

THE sort of thing that sinks into one's mind as a home truth is an advertisement to the effect that the home article is of better quality and of no greater cost than the imported article. It is of no avail to make a noise unless we say something worth while. What is needed is an effective, logical, well-balanced argument which will make the consumer think along the lines of economy and efficiency in regard to the Canadian product. If we do not go in for such publicity at a time like this we render the woodworking industry signal for lack of enterprise and aggressiveness. It is not so much the noise that is required as effective publicity. This we have never had, and it should be coming to the trade in the interests not only of the manufacturer but of every factory employee, for the workman is vitally concerned with any movement which makes for the stability and improvement of his job.

Canadian furniture manufacturers are a conspicuous example of a branch of the woodworking trade which has gone to sleep.

We might mention one prominent firm—one of a number—which is so little alive to publicity that not one of its several factories has a sign on it which can be distinguished by the naked eye except at very short range. Why is this? Are they afraid that to let the

The Day

(From a poem by Henry Chappell, a railway porter of Bath, Eng.)

You spied for the Day, you lied for the Day,
And woke the Day's red spleen.
Monster, who asked God's aid Divine,
Then strewed His seas with the ghastly mine;
Not all the waters of all the Rhine
Can wash your foul hands clean.

You dreamed for the Day, you schemed for the Day;
Watch how the Day will go.
Slayer of age and youth and prime—
Defenceless slain for never a crime,
Thou art steeped in blood as a hog in slime,
False friend and cowardly foe.

But after the Day there's a price to pay
For the sleepers under the sod;
And Him you have mocked for many a day—
Listen, and hear what He has to say:
"Vengeance is Mine, I will Repay,"
What can you say to God?

world know that they are making furniture would stimulate opposition and rob them of some of their business? Or is it modesty? If it be the latter, it is the kind of modesty that is one of the cardinal sins.

We might mention just one furniture manufacturing concern—a Toronto company, in a class by itself—which is showing real enterprise in the matter of publicity.

If such a state of affairs continues, it will not be surprising (with anything like a continuation of the present financial and general conditions) if the industry lapse into a more or less moribund condition.

Trade Development

THE attention of our readers this month is directed primarily to a number of interesting contributions bearing upon the further development of Canadian trade in our particular field. These contributions, we trust, will provide topics for further profitable discussion, and our readers are invited very cordially to submit their views and ideas for publication in our next issue.

Of the various articles, we would direct attention particularly to that contributed by Mr. W. J. Beattie, who makes a number of excellent points, particularly in regard to effective publicity—concerning which we shall have something to say a little further on.

The letter from Mr. E. T. Nesbitt, upon which we commented editorially last month, is now published in full. Mr. Nesbitt's plea for greater enthusiasm in technical training is made most opportunely. It is hardly creditable to the trade to be told by one of its most prominent members that it has not responded to the work that has been done for it in the way of providing schools and equipment. At Quebec, Mr. Nesbitt tells us, little progress in point of numbers has been made during the last three years. The same might be said of the Central Technical School at Toronto—if it be fair to expect the classes to grow proportionately with the greatly increased expenditure.

Most of the articles deal with industrial openings and the opportunities for further development.

Such suggestions as these are entitled to the weightiest consideration at the present time,—and it is not alone for the big man—the manufacturer—to consider them: the factory foreman and the man at the bench have a concern in this matter proportionate to their important part in the trade.

We should all interest ourselves in suggestions making for industrial enterprise. We are told that there are numerous openings for capital in the Maritime Provinces—furniture manufacturing, particularly, being capable of development; we are told that lead pencils could be manufactured profitably here; and one writer points to the large market we offer for the manufacture of fine tools. All such ideas are worthy of consideration and discussion, and we repeat that we shall hope to find the matter a continuous topic in the correspondence of our readers.

The Words of a Friend

(New York Sun)

THERE could be nothing more graceful in expression or profounder in significance than the address issued by the Executive Committee of the Canadian Peace Centenary Association on the occasion of the one hundredth anniversay of the signing of the Treaty of Ghent.

It is a century "since British and American arms have been matched in national strife." In the midst of an earth-shaking war, in which Canada herself is engaged as a unit of the British Imperial system, the Dominion points to the unguarded frontier, more than three thousand miles long, dividing her territory from that of this republic, and says: "We are convinced that the dealings of the great empire and the great republic afford a noble example for the rest of the world. They remain as an ideal in international relations."

And the Dominion points to the century of peace, with its constant increment of friendliness and good understanding, and says, "May many more follow it!"

May no century except of unbroken peace ever follow it! And, The Sun begs leave to repeat, let us thank Heaven for our neighbors to the north of us!

A Straight Tip for the Reader

IF you ever feel like passing any remarks regarding anything you see in your daily work, or any article you read in this paper, put those remarks on paper and send them along to The Canadian Woodworker. Practical men should regard the greater portion of these pages as being free to them for the discussion of all questions of means, modes and methods—and, incidentally, of men.

We are devoting more and more space to such communications. Queries on doubtful points will be published month by month so that the inquirer may have the benefit of the combined knowledge of The Canadian Woodworker's staff and readers.

Therefore, we request YOUR co-operation in making this feature of real interest and practical use. We are going to make it possible for a man to ask a ques-

tion with the assurance that he will receive a useful and practical answer.

Did that new machine give trouble when started up? Did you overcome the trouble? If so, tell us how. If not, ask us how.

Do you agree with previously expressed opinions on the subject of knife bevels for dressing hardwoods?

Do you recognize, Mr. Finisher, that it is out of date to bottle up little kinks you may come across in the course of your work? You do not earn any more money just because you have one more trick in your box than the other fellow.

Experiences with the spraying method of applying varnish will be especially interesting, as this is one of the most modern innovations in the Finishing Room.

Let us hear from you. Your letter will be welcome, even if it is written on a "scrap of paper"—provided it is not coarser than No. 00.

Cannot Scare Old England

ONE of the editors of this journal received a letter the other day from our London, Eng., Correspondent, whose jesting allusion to German attacks upon the Old Country is suggestive of the unshaken spirit and confidence of the people in the "tight little island." "What do you think of the latest air raid," he writes. "My daughter was acting at Yarmouth, and although one of the explosions was heard distinctly, and the members of the audience were more or less covered with fine plaster dust from the ceiling of the theatre, there was no panic, and the principal girl, Miss Gay, never faltered in the song she was singing. The show went through to the finish, the only thing being that many service men left the building to go on duty. We expect bombs daily in London, and that's all about it. No one moves an eyelid."

Awards in the March Essay Contest

ON the usual basis of "the greatest good to the greatest number," **the first prize in our March Essay Contest goes to Mr. Albert Hudson, of Hespeler, Ont., for his article "Efficiency in Contract and Piece-Work."** The subject chosen for discussion by Mr. Hudson is one of wide interest to the trade, appealing not only to every mechanic but also to every employer and foreman, and we have no doubt that the decision will be a popular one. The article, which is published in this issue, shows the application of piece-work and its special advantages from the standpoint of both the master and the man, its particular value consisting in the lucid manner in which the writer shows how best to work in order to make piece-work a success. Mr. Hudson, it will be remembered, was the second prize-winner in the January contest, and his further success will be a matter of gratification to his friends, especially to those who know his painstaking capacity and the extent of his practical experience in the trade. He is an Englishman—a native of Nottingham—and has been in this country about eight years. He is employed by the Hespeler Furniture Company.

The winner of the second prize of $10 is Mr. R. J. Truax, of Chatham, Ont., whose article, **"Planing Mill Savings,"** is also published in this issue. The article by Mr. Truax is brief, but "brimful of meat"—to repeat the phrase used by the adjudicators in their report. This article illustrates the value of drawings in conveying information on a variety of most useful subjects. The title, "Planing Mill Savings," is most apt, for in every instance there is a real saving, either of time or material.

An article to receive special commendation is written on the subject of utilizing wood waste. The author of this article is Mr. Kenneth McGilvray, of Dundas, Ont., a good friend and a former contributor to The Canadian Woodworker, whose descriptions of practical trade topics are becoming familiar to the Canadian woodworking fraternity. Mr. McGilvray has treated his subject very exhaustively, and he gives every evidence of careful and suggestive research work, but his subject can hardly be classified among the more practical trade problems a solution to which these articles are designed to afford.

Another article to receive special mention is "Cost Accounting and the Institution of a Piece-Work System," also contributed by this month's first prize-winner.

"Belts, Bearings and Babbits," contributed by Mr. J. W. Smith, of Berlin, Ont., is an article of good practical value, but one which, in the words of the official report, "ends up with too much stress on subjects not of general interest."

Mr. Albert Hudson, of Hespeler, Ont., winner of the First Prize with an essay "Efficiency in Contract and Piece Work" published in this issue.

We cannot close without a passing reference to the useful article, "A Near-Ideal Planing Mill and Sash and Door Factory," written by Mr. L. A. Blake, of Toronto, and to another, "The Superintendence of a Small Plant," by Mr. Thomas Hogarth, of Amherst, N.S.

We are indebted to all for their co-operation in preparing painstaking contributions for this contest. The matter of adjudication was not an easy one, as

the standard was high throughout and the range covered by the subjects a wide one. To the prize-winners once more we extend our congratulations. To those whose laurels are not of the first or second order we offer encouragement, with the reminder that they are deriving eqtial benefit with the others in stimulating thought calculated to make for their advancement in the trade.

We are publishing only the two prize-winning essays in this issue. The others we have mentioned above will find a place in future columns, and we can promise that they will make profitable reading.

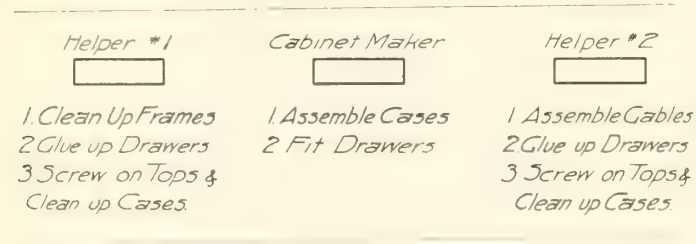
Efficiency in Contract and Piece Work

First Prize Essay, Canadian Woodworker Competition No. 3

By Albert Hudson, Hespeler, Ont.

THERE are to be found some mechanics who prefer the piece-work system, while others would rather leave the job altogether than work on that system. Piece-work is something that cannot be taken up by any workman right away with any degree of success. In order to work on the piece-work system successfully a man must know how to handle the work in the most economical way, and this is the chief problem. It is a well-known fact that some men appear to be working hard all day without accomplishing a great deal, while other men who get a good output seem to be taking things quite easily. The reason for this is simple, for, while the former type may be first-class workmen, they handle their work at a disadvantage and lose time. The other type, by judicious handling, make the work come more easily and get it done in better time, and under the piece-work system they reap the advantage of this in an increased pay envelope.

It pays in every way for a workman to study out in advance the various sections of the job in hand, and to figure the time on each section, so that he can tell at intervals whether he is working inside the price,



without waiting until the whole job is finished. For example, consider a cabinet-maker who receives an order for twenty-five dressers which are to be paid for at the rate of $1 each, or $25 for the whole order. If this man desires to make 25c. an hour, he must finish one dresser in four hours, thus allowing one hundred hours for the complete job. The work may be divided into sections as follows:—Assembling gables, 20 minutes; cleaning up frames, 15 minutes; assembling case, 40 minutes; screwing on top, 20 minutes; assembling drawers, 25 minutes; fitting drawers, nailing on back, and cleaning up case, 120 minutes—total, 4 hours. By estimating in sections in this manner it is always possible to know how much has been earned, even when only the gables, say, have been assembled.

In the actual work, too, there must be system, in order that the minimum of time may be taken up. The writer has been familiar with the contract and piece-work systems, both at the bench and as foreman, for fifteen years, and would suggest the following method for working out the twenty-five dressers:—

(1) Assemble the gables and pile in two piles, keeping right and left-hand gables separate. This will enable a pair of gables to be taken up at once when assembling the cases.

(2) Clean up all rails or frames.

(3) Assemble the cases.

(4) Assemble the drawers, putting in drawer bottoms at the same time.

(5) Screw on the dresser tops, cleaning up the cases as well.

(6) Taking one case at a time, fit the drawers, nail on the outside back, and inspect the case carefully for accidental indentations, scratches, etc., leaving it ready for finishing.

By working in this way it is always possible to know just how the time compares with the value of as much of the work as has been completed. By cultivating this habit of estimating and working accordingly little things are discovered by which it is possible to save time and increase the output, and incidentally the pay envelope. Some may say that their cabinet department is worked on a different system, by which each part is done by a different man. Even in this case each man should know how much of a certain kind of work he can do in a given time, whether it be assembling drawers or whole dressers.

Some cabinet makers are able to contract on one hundred buffets just by seeing the blue-prints or one of the finished buffets of the same pattern. These are the men who get the highest pay, whether on day-work or piece-work. Such ability is acquired only by practice. The only means to a profitable end is efficiency, and it is up to the workman to see that he is efficient in every way, both in laying out his job and in workmanship. All kinds of cabinet work can be outlined in the same way as the dressers taken as an example. In cases where the one cabinet-maker is provided with two learners as helpers the system must be modified in some of its details, but it can be used just the same. If the helpers were to receive $1.25 each per day on the dresser job, this would bring the total amount to be earned by the gang up to $5, and the cabinet-maker would have to see that $5 worth of work was done in the day, calculating the helpers' time on each section in proportion to his pay, taking the man's own time and the pay earned as a basis. Thus one helper, receiving only half as much money as the cabinet-maker, would be allowed twice as long in which to do the given work. Strictly speaking, however, the helpers would be expected to work a little faster than this, in order to provide a margin for the head man by which to pay him for time lost in showing the helpers and in making good their mistakes. It is of course impossible to expect the helpers to be as good mechanics as the cabinet-maker himself, but it is up to him to give them such instruction as will help them on the road. The cut shows how the three benches should be ar-

ranged, and the work allotted to each in the case of dressers.

When Helper No. 1 gets through with the frames he can start on the drawers, and No. 2 can do the remaining drawers when he finishes assembling the gables. After the drawers are done, both can go on and screw on the tops and clean up the cases, leaving the cabinet-maker to assemble the cases and fit the drawers.

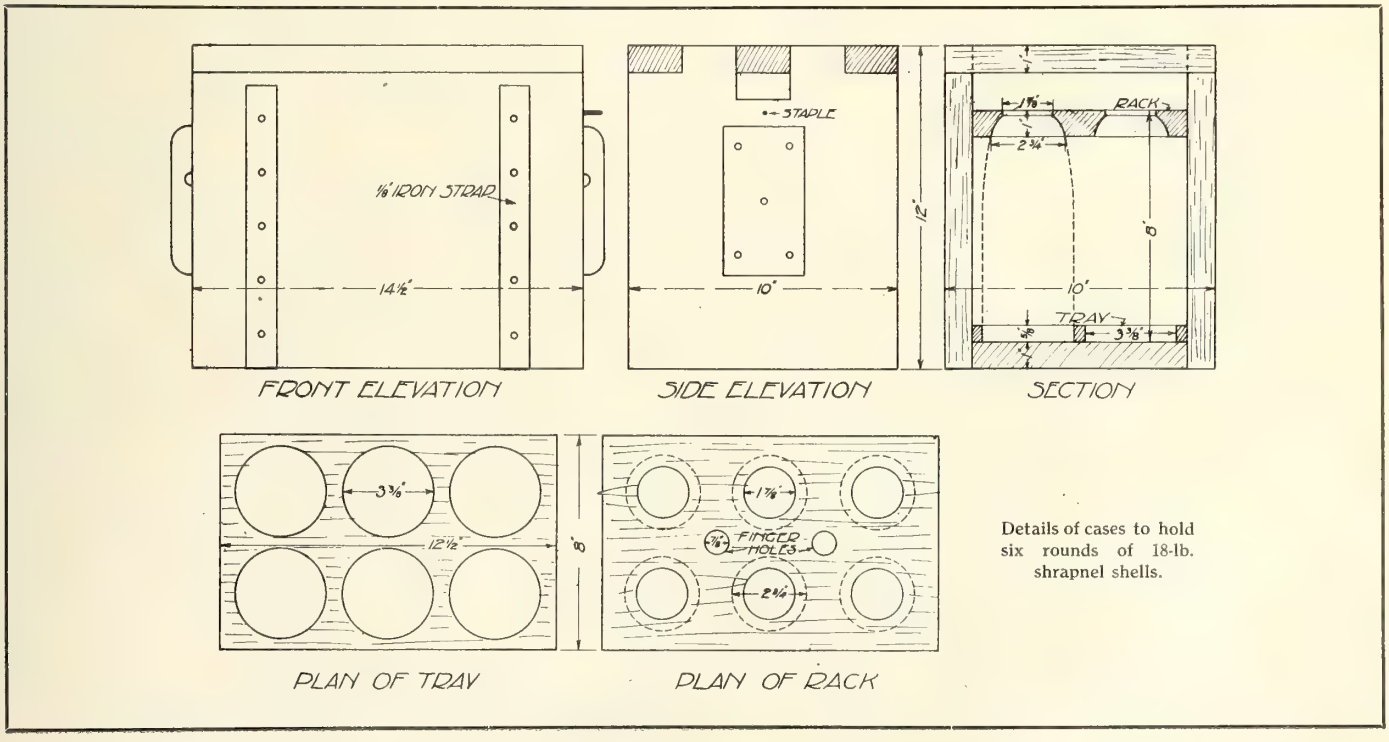
I have found in my experience that if the helpers are young men learning the trade it is wise to give them similar tasks at the same time, so that both are in a sort of competition all the time and they will therefore speed up without feeling driven or overworked. As the helpers may be through with the tops before the cabinet man has completed the fitting, it would be only fair to allow them to do some of the fitting. This is where the workman may have to lose a little time in giving personal attention to the helpers, but if he considers their future at all he must give them at least so much attention, although he need not lose by it financially. By allowing the helpers this privilege they gladly get through their allotted tasks a little quicker in order to get a chance to do a little of the better work, and naturally the time taken on the job is shortened.

I always reckon that a helper should do 25 cents' worth of work above the amount of his wages, this extra money indemnifying the cabinet-maker, as it were, against the losses due to taking time to instruct the helpers and to overlooking them even after they get used to the work. The question of handling helpers is important, not only to the man who depends on their assistance, but also to the firm for whom the man works. It is a question that cannot be slurred over, but one deserving earnest consideration.

The Manufacture in Canada of Cases for Shrapnel Shells

THE present struggle in Europe has served to make a little worse a situation that is generally admitted to have been inevitable in any case at this stage of our history. This is in the general aspect only, for in some particular instances the war has helped to fill up the slack time by the action of the Allies in giving Canada contracts for war supplies. To the woodworking trade these orders have come chiefly in the form of cases for the shrapnel shells, which are now being made in large quantities by Canadian metal working firms.

In Toronto the distinction of being the first manufacturers to ship shrapnel shell boxes on Government orders belongs to the Beverley Wood Specialty Company. The order they received calls for three thousand boxes each to hold six 18-lb. shrapnel shells. All the outside portions of the boxes are dressed two sides to a thickness of 1-in., while inside the bottom there is a 5/8-in. basswood tray, with six holes to receive the bottom ends of the shells when packed. The sides, top and bottom are of Canadian spruce, while the ends are of birch. There is another interior tray at the top to fit over the noses of the shells, and the six holes in this tray are counter-sunk from beneath. Inside the lid there are two spruce laths, 3/8-in. x 1½-in. which require four nails each. There are two bands of 1⅛-in. iron passing around the bottom of the box and having the ends turned into the sides near the top. Each of these iron bands calls for ten screws, four on each side and two on the bottom. All these boxes have to pass a Government inspector before leaving the factory, after which they are sent to



Details of cases to hold six rounds of 18-lb. shrapnel shells.

different firms in the city who are engaged on the contracts for shells. As soon as the shells are packed they are dispatched to Europe.

The Valley City Seating Company, Limited, of Dundas, Ont., have an order for 6,250 boxes for shrapnel shells. These boxes are 30 inches long, 10 inches wide and 9 inches deep, and each box is made to hold four shells. The sides, top and bottom are of pine, while the ends are of birch or elm. Corner joints are dovetailed and glued, and have two bands of hoop iron. The lids are bolted on, and there are about forty pieces inside the box to fit the shells. Four of these pieces have to be faced with copper plates ⅛-in. thick, and all the screws, rivets, etc., inside the boxes have to be of brass. It is reported that another order for 10,000 boxes has been placed with the same firm.

Messrs. Jones Brothers & Company, of Dundas and Toronto, are now working on an order for over three thousand boxes of about the same size, but these boxes are to hold six shells. It is reported that there are three different kinds being made at different factories in Dundas, and also that at least one firm in Hamilton is making these boxes.

Some of the shells for which these boxes are required are also being made in Dundas by The John Bertram and Sons Company, Limited, while the Canada Steel Company, of Hamilton, have a contract for about one million shells, and are sub-letting contracts for the boxes. The Canadian Inspection Company, of Montreal, is doing all the inspection.

The first load of shell cases shipped from the factory of the Beverley Wood Specialty Company, Toronto.

One of the most expensive woods used regularly in an established industry in the United States is boxwood, the favorite material for wood engraving. It has been quoted at four cents a cubic inch, and about $1,300 by the thousand board feet. The better wood engravings are made almost exclusively of boxwood, and the large blocks are made of small pieces glued together. The engraving is done across the end of the grain. Japanese wood prints, on the other hand, are made on lengthwise sections of cherry wood parallel to the grain.

Recent experiments indicate that round timbers of all the pines, of Engelmann spruce, Douglas fir, tamarack, and western larch, can be readily treated with preservatives, but that the firs, hemlocks, redwood, and Sitka spruce, in the round, do not take treatment easily. This information should be of value to persons who contemplate preservative treatment of round posts, poles, or mine props.

QUESTION BOX

The Best Motor for a Box Factory

Q.—"What would be the best size and type of motor to drive a 2-in. shaft 30 ft. long and driving one box-board matcher, one single saw edger table, and three cut-off saws? The power obtainable is 3-phase a.c. at 550 volts, 60-cycles."

A.—The best motor for the work you have outlined above is without doubt a Squirrel Cage Type, G. E., Westinghouse or other standard make, 10 h.p. mounted on the ceiling if possible on a sliding base and connected with the line shaft by belt of sufficient length to alow the belt to run slack without slipping, with the pull on the under side. The motor should, **without fail,** be provided with a compensator with an oil bath covering the contact points, which should be one of the true compensators, in which the starting current is supplied to the motor at a reduced voltage through a transformer incorporated in the compensator, and under no circumstances one of the type which employ resistance and a double throw switch to control the starting current. The machines should be connected with the line shaft in the usual way by belt and tight and loose pulleys, so that those not actually in use may be stopped, and to allow the motor to start under as easy a load as possible. You should have the fuse blocks and switch cutting out the fuses and compensator, mounted in an iron cabinet directly over the compensator so as to make the replacement of fuses and repair or adjustment of the compensator safe, this point being mentioned because contractors sometimes omit the switch and thereby save a little money at the owner's expense. If you should happen to consult machine builders as to the size of motor required, you will no doubt get an idea that a much larger motor is required, but you can rest assured that if you get a standard motor, the size named is sufficient and as large as will work economically. We shall be glad to give you any further information you may require.

The Use of Belt Dressing

Q.—"We, and I believe many others, are constantly being vexed with the problem of a suitable belt dressing. There is always a new and better one on the market, and while it must be admitted that some of them do the work claimed, they are at best an expensive luxury around the shop We would like to know the truth in regard to this dressing matter, and what it is necessary to do to keep belting in good order?"

A.—Most of the so-called belt dressings are nothing more or less than rosin mixed with some fat or oil, whose function is to make the belt stick to the pulley and pull more than its normal load for a time, incidentally ripping up the face of the leather and allowing the rosin to penetrate into the grain where it will eventually rot and destroy the belt. What oil these dressings carry is powerless to overcome the damage caused by the rosin, and the best thing to do with them is not to use them at all. Some of them do not contain harmful ingredients, it is true, but these are nearly always the good old neatsfoot or castor oils disguised in some way to justify the price asked. If

you want to keep your belts in first-class condition at the lowest price, keep them clean, straight, properly tensioned and treat them about once a month with a few drops of neatsfoot oil, just enough to soften the surface but not enough to make them slip. This oil is a natural food for leather, and is a lot cheaper than the cheapest belt dressing. Give the care of your belting to one man and make him responsible for it.

Back Pressure on an Exhaust Fan

Q.—"We wrote you last month regarding back pressure on one of our fans, and while we have made the changes you have specified, with considerable increase in efficiency, we must admit, still there is the back pressure, which makes it necessary for us to use considerably more power in operating the fans than we think should be necessary if they were running properly. The results we obtained through following your advice were so satisfactory that we are going to ask you to carry the matter further and see what is required, provided we are not presuming too much upon your time and space."

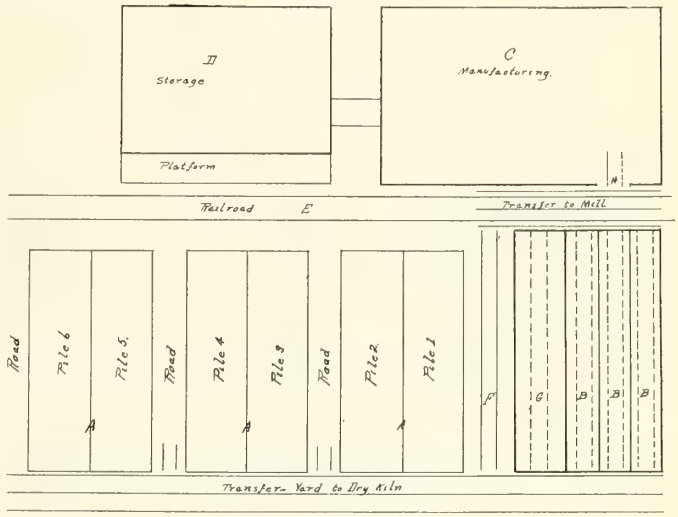
A.—We are rather surprised to learn that the adjustments to your exhaust system which we suggested did not entirely eliminate the difficulties you were having, but if you still have too much back pressure, it is very evident that there is something radically wrong with the discharge end of your system. Look over all the pipes leading to the separator and be sure that the elbows are not clogged with knots and other rubbish, and that the inside of the pipes is perfectly clean and free from any obstructions whatever. Also see that the pipes are full size all the way. Measure the area of each pipe and be sure that the added areas of all of them is less than the area to the entrance to the separator. Also measure the area of the circular outlet at the top of the separator, which should be at least three and one-half times as great as the area of the entrance and unobtsructed by the cap. Unfortunately some separators have been made by men who did not understand the nature of the matter they were handling, and it would not be strange if you have one of these. The remedy is to correct the dimensions to approximately those given above, and this is not a difficult matter. Should your system then fail to work properly, we shall be glad to go into the matter further, but please in writing, be sure to give all the details possible.

Lay-out for Chair Factory

Q.—"We have to move our manufacturing outfit within a few months, and would like the benefit of someone else's opinion as to the lay-out of the lumber handling facilities, and shipping arrangements, and are therefore taking the liberty of putting the matter before your Question Box Department, hoping that you will be able to give us some new light on an old subject to us.

Our property consists of about two acres of land, in a strip between the public road and the railway, the factory being on one end close to the highway, with a siding from the railroad running right through the property and close to the factory. The factory itself is a three-storey brick building, with good light all around, and good solid construction. It is about 125 feet long by 50 feet wide, and the bays are approximately 21 ft. by 16 ft. Our product is chairs of various kinds, but mostly rocking chairs built from round stock and with cane seats and backs. We require large storage facilities, and wish to build a store house on the property in the most convenient location."

A.—The accompanying sketch, which, being drawn from a printed description, is probably only approximately correct in detail, best illustrates the problem and the solution which we would offer, furnishing as it does, an ideal outfit for the handling of almost any medium weight article made of wood, which must be taken from the rough lumber in large quantities and manufactured into a comparatively light but bulky product. In the sketch, "A" represents a large lumber storage with lanes running at right angles to the mill and railroad, each lane terminating at the three rail transfer track, and containing a short length of two-rail track long enough to contain a dry kiln truck while loading from the adjacent piles, the lumber being transferred from the piles to the trucks, if preferred, by a movable length of gravity carrier. Once loaded on the cars, it is rolled on to the transfer car and moved toward the kiln at "B," and may be either put directly into the kilns or stored on the track at "F" to await its turn at drying. The kiln itself may be built in any of the various forms, the one here shown being a three-tunnel progressive one, with a covered



Plan of chair factory.

tempering platform at "G." A short transfer track between the kiln and the mill proper furnishes access from the kiln to either of the storage tracks or to the mill at "H," from where the lumber goes through the various preparatory stages for assembly, which is performed upon the top floor, leaving the middle floor for the finishing operations, so that the product may be moved by gravity down a slide to the warehouse at "D." The railroad at "E" furnishes loading capacity for about three cars at one time, from which lumber may be unloaded or into which finished product may be loaded, without interfering with each other. A separate switch and short spur track could be put in place of the loading platform of the warehouse, if at any time it should seem desirable, and thus eliminate any possible friction between the loading and unloading gangs. This is a lay-out which in its completed state is ideal for cheap handling of material, and its greatest advantage lies in the fact that it need not be installed completely to work. With the ultimate plan in view, you can start with the mill, dry house and lumber storage, and extend the tracks and other improvements as fast as they may be needed, each move toward the complete lay-out meaning a very material saving which will justify the necessary expenditures.

Planing Mill Savings

Second Prize Essay, Canadian Woodworker Competition No. 3.

By R. J. Truax, Chatham, Ont.

IN making ⅜-in. ceiling, which is always resawed, I match first with double tongue and groove as shown in the sketch and resaw afterwards, thus doubling the speed of matching. Ship-lap can be worked in the same way, the 2-in. x 6-in. lumber being put through the matcher, and having a wide tongue and groove worked as in Fig. 2. This is also resawed after matching. Another saving can be made in sticking picture rail moulding, by setting up the top head to cut as in "A," Fig. 3. Then a knife is set on the bottom head to cut right up through the piece as in "B," thus making the two moulded strips at one operation. The same cutters can be used if the stock is only wide enough to make one piece of moulding, or, provided that the stuff is all of uniform thickness, two strips can be put through at once. This is just an illustration of what may be done on a sticker. To facilitate setting up, make a templet to fit the head as in Fig. 4, and when knives are properly set up draw around the edge, and then at any time the knife can be set to the same mark again, without any cutting and trying. For setting straight knives where the lip of the cutter head has been worn unevenly, a gauge as in Fig. 5 is best, as it fits right on to the face of the head. Large semi-circular grooves may be made on a circular saw by setting the fence as in Fig. 6, and lowering the saw until it works the required depth. The width of the groove depends on the angle of the fence. This method saves making large knives for the sticker. Fig. 7 shows how to cut up one piece 2-in. x 8-in. x 12 ft. long to make three sills 4 ft. 2 ins. long for a frame building. A convenient shop method of drawing a segment head when the length of the chord line and the rise are given is shown in Fig. 8. Draw the chord line and drive a nail at both ends, and also put in a nail at the highest point of the rise; then lay two straight-edges, touching both the nails and the centre of the rise, as shown. Nail the two straight-edges together in position and remove the centre nail. Place a pencil at the intersection of the straight-edges, and work them backwards and forwards against the nails at the end of the chord line. The pencil will then trace the required segment.

In making door panels for oval glass a true half-ellipse can be drawn on a half-panel by fixing a straight edge on the panel with the end projecting through the centre of the panel and at right angles to the edge. By using a rod with three trammel points placed as shown in Fig. 3, and sliding along the edge of the panel and the straight-edge, a true half-ellipse can be drawn. The two halves of the panel are

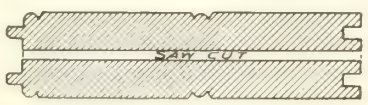


Fig. 1.

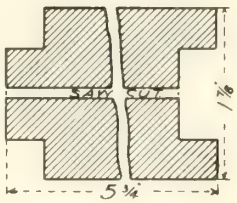


Fig. 2.

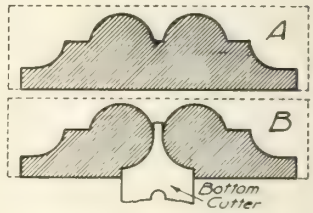


Fig. 3.

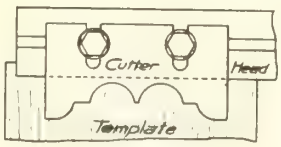


Fig. 4.

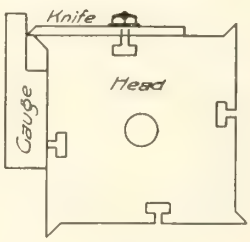


Fig. 5.

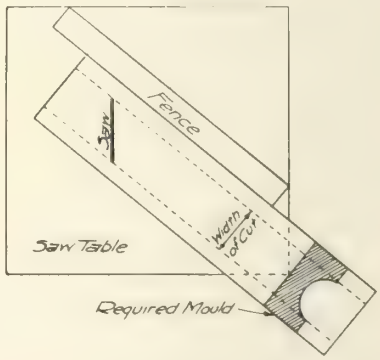


Fig. 6.

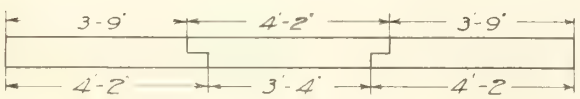


Fig. 7.

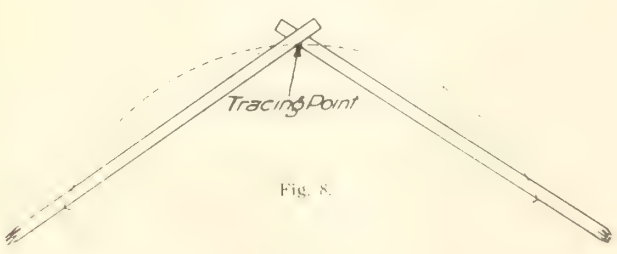


Fig. 8.

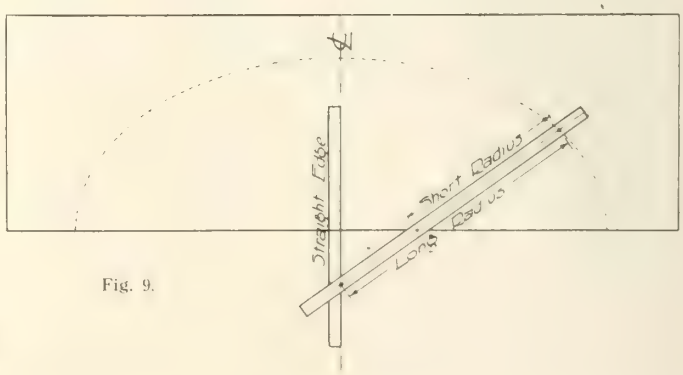


Fig. 9.

then tacked together and cut to the line, when they are ready to be glued together. An ellipse can also be drawn by driving two nails, one near either end of the major axis of the required ellipse, and looping a piece

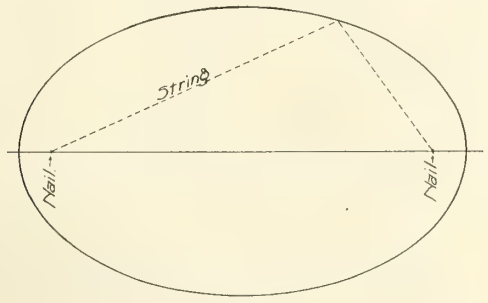


Fig. 10.

of string around them long enough to reach the extreme of the minor axis, as shown in Fig. 10. By following the slack of the string with a pencil the full oval can be drawn.

The Hardwood Market

THAT the turn of the tide is near at hand is the general opinion prevailing at present in the hardwood market. While not all dealers have yet experienced any change, one report indicates that the better classes of lumber, particularly mahogany, are moving almost freely. This wood, which has lately sold at from $160 to $200 per thousand, according to grade, is chiefly in demand for the interior trim of the large office buildings which have been carried on in spite of the present financial unrest. The stability of the companies having these buildings erected has been the mainstay of the building and its dependent trades, for the ordinary house building business is practically at a standstill. This accounts for a state of affairs which at first may seem incongruous, namely, that high-priced woods are in demand at a time of trade depression. Factory stocks are being kept as low as possible, as are those of the dealers, but in spite of the need for such a policy, it is still possible to see smiling faces even when the subject of trade conditions is approached.

This winter has seen a general clean-up of credit accounts. All possible collections have been made and the remainder written off, so that the year has been commenced with a pretty straightforward sheet. Present conditions do not warrant the buying of large stocks in order to get them at a reduced price on the chance of selling later at a normal level. It is generally considered that the best business policy in the hardwood lumber trade at the present time is to buy such stocks as can be disposed of readily and paid for. There is still some export trade, in spite of the fact that freight rates on lumber to Liverpool have risen from 28 cents to 45 cents, and that all quotations are made subject to freight, so that the higher rate means a higher price at the other side. In view of this fact it is gratifying to learn that there is still even a small quantity of export business now being done in Canadian lumber.

Now that the European war has closed the Dardanelles, the supply of Circassian walnut has been cut off; consequently figured red gum, which has already become a serious rival of the imported walnut, will be even more in demand, especially for furniture veneer supplies. It may be said, however, that at the time of writing, gum, whether the plain variety used for enamelled furniture, or the figured lumber which is substituted for the high-priced imported walnut, is very quiet. Even the walnut, if it were on the market, would be little in demand, so it is hardly reasonable to expect a substitute to show activity.

The market trade is improving, but local consumers are not giving any evidence of increased demand. The making of war supplies by several Canadian factories has caused activity in such woods as are used on these contracts, but other woods have not shown any movement. Most of the regular buyers are taking woods in small quantities to meet orders on hand, but neither these nor the wholesalers are taking any material into stock against possible future demands.

The present time seems to afford a better opportunity for the man who is willing to exercise discretion in buying and who is not liable to be influenced by the offering of lower prices on larger quantities.

Taking all things into consideration, there is no cause whatever for any discouragement, for although the usual spring activity has not made its appearance on all sides as yet, reports show that it is well on the way. While there would be nothing resembling a boom at this time, even without war troubles, these same troubles are not worrying the sound business man in the lumber trade, because a period such as this brings speculative business to a stop, and their trade goes to the man who has been able to hold on.

Ebony a Venerable Wood

Ebony, which is sometimes used in making black keys for pianos, and which is probably the most costly of timbers, has been known for thousands of years. The supply in the main comes from Ceylon, Madagascar and West African districts. The wood is heavy, deep black, hard and solid with an internally black color. It takes polish readily, and can be given the most beautiful finishes.

Ebony is imitated to a great extent by using the wood of fruit trees, especially of the pear tree.

Lately Africa has furnished the Wat-wood, which seems to furnish a good ebony imitation.

An artificial ebony is also reported as made by taking a material of sawdust, water and blood, and compressing it under an enormous pressure.

Who Contemplates Installing New Machinery or Equipment?

The Canadian Woodworker and Furniture Manufacturer will appreciate receiving information relative to the proposed building or remodelling of woodworking or furniture factories, or news items of any kind which will be of interest to our subscribers and advertisers. The next time you hear of any news, drop a line about it to the Editor of this paper. It will be appreciated.

Canadian Industrial Opportunities in the Light of the War

In this issue of The Canadian Woodworker we present numerous interesting discussions of the possibilities of trade development opened up for Canada and the Empire by the readjustment brought about by the European conflict. The opening article, written by Sir George Foster, K.C.M.G., M.P., Minister of Trade and Commerce, contains a statement of suggested general principles upon which Canadian industries may best be extended. In the Minister's advice there is a forceful appeal which cannot fail to carry weight with manufacturers and business men, for everybody knows that Sir George speaks out of a ripe experience which has made him Canada's leading authority in the special province of the important Government Department of which he is the head. The remaining contributors cover a wide range and discuss many aspects of the question—particularly, of course, those phases of near concern to woodworkers.

At such a time as the present too much attention cannot be devoted to a consideration of the status of Canadian industry and of the manner in which the country is responding to the ever-widening channel of New Opportunity. We ask our readers to read the observations of Sir George Foster and the other writers, and then send us an expression of their views for publication in our next issue. With a view to stimulating interest in this topic, we are making a special inducement for such letters. The attention of our readers is directed to the announcement on page 24.

Sir. George E. Foster

Endless Manufacturing Possibilities, says Sir George Foster, K.C.M.G., M.P., Minister of Trade and Commerce

It is so easy to keep to the well-worn courses, buy and sell where we have been accustomed to buy and sell, and choose what we have been accustomed to choose, that it requires something like the violent and costly dislocation which the war has brought about to shake us out of the ruts. Now by necessity first, and the exercise of common sense next, we are envisaging the possibilities, and to our surprise we are beginning to see endless sources of supply and possibilities of manufacture of which we were before all too oblivious.

Every dollar saved in the import of raw materials for industrial production decreases or avoids indebtedness abroad, and vivifies natural development at home. Every process successfully initiated and operated here employs and trains hand and brain, and adds to our unit strength, whilst at the same time it saves for disbursement here what otherwise would go to outside countries. And the benefit runs like fresh, vitalized blood through all the veins and arteries of the body of industry, and imparts health and strength.

Nor need we fear that however much we may increase the Made-in-Canada production, we shall not have much to exchange with outside countries; on the contrary, we shall probably have more, for we shall create both the supply for exchange, and the financial ability to purchase abroad.

Adaptation is the mark of resource and alertness, and Canadians are showing these qualities in the way they are taking advantage of opportunity both in the solicitation of unwonted orders, and their quick organization to make and make well what they thus obtain.

To fill the void caused by cessation of supply from long-established sources, by producing the same or equivalents of them is only one step, and the least important. To so marshal and organize and perfect, as to be able to hold the business when conditions of competition gradually return to normal is far more essential—not to manufacture merely for the Empire's emergency, but to establish the permanent industry.

May I add two cautions:—

1. The patriotic impulse may help to excuse for a limited time crudeness of make and comparative lack of quality, but will not carry further. The wares must be up to the mark and reasonable in price, or the economic impulse will prompt customers to seek what they want where these two qualities are found. Neither the flag nor the hurrah will suffice to excuse lack of good workmanship or extravagance of price.

2. The natural desire to bridge the period of unemployment, and keep the wheels going on unusual army contracts, should not divert the minds and energies of our producers from the necessity of pursuing the staple lines of industry and finding markets at home and abroad for their output. These abnormal needs, we hope, will soon abate, and the wise makers will, from the first, differentiate between the temporary and the usual, and whilst making what they can of abnormal calls, will remember that their **business** is to cater for the normal and continuing wants of humanity.

George E. Foster

How to Promote Trade in Canadian-Made Furniture

By W. J. Beattie, Owen Sound, Ont.

This question is one of vital interest to manufacturers in this country. Especially is this so in view of the fact that furniture to the value of over three million dollars was imported during the fiscal year ending March 31st, 1914 (see table of woodworking imports hereunder).

On the face of it the Canadian manufacturer, who has a protection of thirty per cent., would appear to be incompetent. But is this so? We all know that perhaps ninety per cent. of the United States furniture manufacturers are able to keep their plants running on a very limited line. They have such a large home market that they can specialize to a much greater extent than we in Canada. Another point is that a great deal of the furniture imported into this country from the United States is of a very high grade, and it would not be a paying venture to the Canadian trade to embark in it, although our manufacturers are quite capable of turning out these high grade goods.

Yet another contributing factor is the lack of practical patriotism on the part of the dealer and the buying public. Many people find a glamor in the imported article, and the salesman always makes the most of this tendency, the extra price not being so much of a consideration with many people.

A part of the movement in goods of foreign manufacture can be traced to effective advertising in magazines which have a large circulation in Canada. The firms become known to Canadians, and there seems to be nothing strange in the idea of buying their products. As far as ability and equipment are concerned, the Canadian manufacturer is in quite as good a position as his rival—if he is not, it is his own fault; but in one respect he is behind his competitor, and that is in originality of design. Too much copying is done, with the result that often we find several firms making exactly the same pattern. This can only lead to the slashing of prices—a development which may benefit the consumer, and may not.

How to keep the greater part of that three million dollars at home is worth a whole lot of effort. If the United States manufacturer does not use Canada as a dumping ground for his surplus, which means that he is selling his product below a fair valuation, there is no reason to fear his competition as far as value is concerned. But how are we to know that the value is fair unless more information be given? Our competitor's declaration simply states that such and such a price is a fair value for home consumption, i.e., in the country of manufacture. We simply have to take his word for it.

There is no doubt that the Made-in-Canada campaign is being productive of good, and if we "keep everlastingly at it" we should be successful in making the good permanent.

WOODWORKING IMPORTS

	Germany	Austria	Other Countries
Billiard tables	.....	.....	$ 103,804
Brooms and brushes	$45,276	$ 1,604	644,135
Carriages—railway, etc	6,183	.....	437,888
Cabinet organs	.....	.....	24,550
Pianos	9,433	.....	412,647
Pianos, parts of	11,560	.....	279,557
Piano and organ parts for use in Canadian manufacture	12,485	.....	103,693
Pencils, lead	79,345	15,797	265,076
Pens, penholders and rulers of all kinds	5,172	.....	208,782
Furniture	6,873	22,220	3,020,781
Other wood and manufactures of	47,272	3,702	13,394,119

I am inclined to think there is not a great deal in the idea of doing additional trade with the farming community. As far as I know, the farming trade is nothing like proportionate to the urban trade. The average farmer—who is in the great majority—does not live nearly as comfortably as he might. Persuasive agents impress upon him the relative advantages of various kinds of farm implements, telling him of the labor that he will save and the money that he will annex by purchasing this or that particular make—all of which may be quite true; but what of the wife and daughters who need furniture to make the home attractive? They are the ones to reach. How are we to reach them? Every man knows that it is his wife or daughter who first expresses the desire for a new bed-room or dining-room suite—and, for that matter, all the rest of the various items of household equipment covered by the word "furniture." Ninety-nine times out of a hundred the women make the first move. The question then, in rural life, is how to appeal to the feminine imagination. How can we parcel out the various counties or ridings so that each farmer's wife and daughters will be reached by personal letters and descriptive circulars, giving suggestions and plans for improving and beautifying rooms at a moderate cost? This is a job for advertising experts.

An appeal to patriotism can only be made very tactfully. The point is to make these women really want the goods, and to keep on wanting more. Few furniture manufacturers do any advertising outside of the trade papers—whose influence, of course, is confined almost exclusively to the retailers, who do their own advertising in their own local papers. In these local lines we find some retailers doing effective work in keeping track of young couples, using their own judgment as to the time to inform them that the very furniture they require may be obtained at such and such a store. But there still remains an important field, consisting of people who have been keeping house for twenty years or more, whose furniture is old or out of date.

The piano manufacturers are great advertisers. Their aggressiveness is commendable, and a measure of it might be employed to advantage in the furniture business.

Summing up, I am inclined to think that the furniture industry is too modest, and that lack of co-operation between the manufacturer and the dealer, taken in conjunction with insufficient advertising, is largely responsible for the present state of affairs.

* * *

A Quebec Woodworker's Suggestions

By E. T. Nesbitt, Quebec, Que.

While I regard the theory of "trade within the Empire" as an excellent one, I have experienced some difficulty in putting it into practice, owing to the lack of a something which I can hardly describe. It may be lack of energy, or possibly a certain incapacity for getting business on the part of the man selling the goods. As an illustration, a short time ago I wanted to put in a certain piece of machinery in my woodworking plant. By correspondence, catalogues, etc., I obtained all possible information from Canadian and U. S. makers. The American machinery seemed far ahead of the Canadian machinery, but then I received a catalogue from England relating to a machine which would do the very work required and at a much lower price. The description of the machine was indifferent, however; the terms employed were not familiar to me, and I could not get the clear meaning of them, so I wrote several letters for more particulars and received explanations from the English firm. But whether they did not understand me, or I could not understand them, we arrived at no understanding. In the end I gave up in despair and

bought an American machine. I am still ignorant of the merits of the English one.

If the English manufacturer is going to develop the Canadian trade he must come over here with his samples, display them in a show room and exhibit them at our Fairs, giving us an opportunity to make an actual comparison and get in direct touch with the principals, just as the United States people do.

To manufacture within the Empire is to encourage its trade, but technical training and skilled labor are required, and these we do not possess. For example, a company here manufacturing rifles for the Dominion Government has secured immense business from England owing to the war, but it has had to bring in skilled labor from a foreign country. When the war is over these men will return to their homes without having made any contribution to the development of trade within the Empire. Here is an opportunity. The war is giving an impetus to this industry, and if we had skilled workmen the trade could be carried on to the benefit of the Empire.

We must look to our facilities for technical training. In this there is no reflection upon what has been done. The provincial governments, in fact, are doing very well. The province of Ontario has provided well-equipped schools in Toronto, while the province of Quebec has one in Montreal and one in Quebec City. The authorities have done their duty at considerable expense, the buildings are well equipped and the professors are capable men. But more remains to be done; more must be done. Parents must be awakened to the advantages of technical training and boys must be educated to seek it. The Quebec school has now been open three years and I am sorry to say that it has made very little progress in point of numbers. Surely such work as the Rifle Manufacturing Company is carrying out should be essentially an industry within the Empire, but I understand that the material and tools for the manufacture of these rifles are imported. If this is so, what can be said of it?

* * *

"Made in Canada" First, "Made in the British Empire" Next

By A. Hutchison, Montreal, Que.

The development of Imperial trade, in times like the present, should be an aim dear to the hearts of all Canadians, as it can be productive of nothing but good, while at the same time it will strengthen the tie that binds us all together into one great Empire.

The trade returns between Canada and Great Britain, while they have been improving during the last few years, are not at all what they should be. The fault, such as it is, lies on both sides, but recent attempts to improve the position of the British manufacturer in Canada have been in the right direction. The great difficulty has been to overcome the conservatism of Old Country practice and bring it in line with the ideas of the Canadian buyer. Unfortunately, our ideas are based very closely on those of our friends to the south; however, the British manufacturer is nothing if not enterprising, so that if he is willing and able to re-arrange his methods to meet our ideas it rests with us to co-operate with him to the best of our ability.

There is no doubt that the proximity of the United States has a great influence on this market. The ease of transportation is very much in their favor, with the result that deliveries of goods are obtained more readily than from Great Britain. This is one of the main points at issue. The Old Country manufacturer cannot understand why his American competitor can turn out work so quickly. The principal reason seems to be that the American specializes more than the Britisher, so that his shops are laid out for more rapid despatch of work. The difference, however, is not very great, and it is one which can easily be overcome if the Canadian buyer will anticipate his requirements a week or two. Against the British manufacturer there is always the ocean transportation, which entails innumerable handlings and liabilities to damage. Every effort is being made to guard against damage, and the results are becoming more gratifying every year.

Old Country manufacturers are now beginning to appreciate the value of this market, and great thanks are due to the indefatigable efforts of our Trade Commissioner, who is thoroughly alive to the situation and whose work is meeting with the success it deserves.

The successful launching of British goods into Canada requires, above all else, the services of competent men to direct prospective buyers. There are innumerable articles which could be put on the Canadian market to advantage and the opportunity is always at hand for the enterprising individual to achieve success. Unfortunately, a great deal of trouble has been caused by an unwise choice of agents on the part of the British manufacturer, with the result that the Canadian market has lost its charm in cases. The representative in Canada should have at his fingers' ends all the details of the goods he is selling, so as to be in a position to answer any query put to him by a prospective buyer. There is nothing which annoys a buyer more than the inability of a salesman to furnish essential information, and very often the man on the spot with a knowledge of the situation has a great influence on the swinging of an order.

Nowadays, we hear quite frequently the slogan, "Made in Canada," and much there is to commend it; still, it is well not to allow oneself to imagine for a moment that everything that Canada requires for her growing needs can be made in this country. Even the oldest countries are unable to produce all that they require, and they have to import a great variety of articles for their miscellaneous needs. Much more so is this the case in Canada. A young country, such as this, without the vast experience of the Old Country, cannot expect to be in a position to branch out into the development of all kinds of articles which require so many years of close study and research to achieve that perfection which is the assured quality of British material.

The purchase of Canadian-made goods has much to commend it, as it helps to build up industries necessary to the development of the country, but it would certainly be a mistake to give the Canadian manufacturer a prohibitive tariff, as industry would then be growing up along the lines of false economy. Wholesome competition is what is required, as in this way the Canadian manufacturer will be trained to take his proper part in that world-wide trade which should be his aim in the near future.

By all means let us one and all help along the Canadian manufacturer, so that he can have a reasonable profit on his goods, but do not let us arrange matters so that no one else need apply. As far as possible, the aim of the Canadian buyer should follow the lines laid down by Hon. Sir Geo. E. Foster in his recent speech in Toronto. Sir George says that when he wants to buy anything he will see that he gets the Canadian article, if it can be obtained at a reasonable figure; otherwise he will buy what is made in the British Empire.

Give the British manufacturer his due! If it is a question between American or British goods, let the casting vote be in favor of the latter, as in this way the bond of union will be really strengthened and we can say with a surety, "Trade Follows the Flag."

"What We Haven't Got We'll Make—or Do Without"

By W. B. Mackenzie, Moncton, N. B.

An industry which should pay in the eastern part of the Dominion is a creosoting works. The people should demand that all Government structures built in wood, such as wharves, breakwaters, railroad ties and bridge-floors, should be creosoted or treated with some good wood-preservative. The forests are now being depleted and one-half the wood cut is either wasted by being left to decay in the forest, or is allowed to rot after being erected, for want of a preservative. We now export creosote and bring it back in creosoted timber. At the present time we are using many things made in the countries of our enemies.

Hereafter our motto should be "What we have we'll hold, and what we haven't got we'll make—or do without."

* * *

More Detailed Information as to Imports

By R. R. Knight, Fort William, Ont.

With her vast natural resources and immense possibilities in the way of power development, Canada has unequalled opportunities of industrial development. She is within easy access of the European market—a most important factor.

The proper publication of imports to the Empire, giving helpful details as well as statistics, would tend to open the eyes of capitalists to the opportunities that exist in the way of establishing new industries in this country. I would advocate the publication of Bulletins on Production by a Government department. Such a department, assisted by a board of competent advisers, could do excellent work in furnishing information to industrial applicants.

My suggestion is partly met by the Weekly Reports of the Department of Trade and Commerce, but what I have in mind is the furnishing of information concerning imports to all British possessions from foreign countries, so that Canada could look them over and compete in the production.

* * *

Revision of Tariffs

By Geo. E. Drummond, Montreal, Que.

Unquestionably a legitimate and most considerable trade expansion can be secured in many lines of business within the borders of the Dominion, and throughout the Empire, but it cannot readily and safely be accomplished without first securing a sane and scientific adjustment of Customs tariffs to meet effectively the competition of foreign countries.

Primarily, we must devote our attention to securing a tariff for self-preservation, and the full and proper development of our trade within the home market, and, secondly, to conserve and extend our inter-Imperial trade.

Our own Customs tariff is still "a thing of shreds and patches," and badly requires revision. Then the Mother Land must bring her trade policy into line with that of the self-governing dominions, if we are to arrive at a workable arrangement for the up-building of inter-Imperial trade.

For years I, like many others, have worked, in season and out of season, to further the policy of preferential trade within the British Empire, the prime object being to reach as speedily as possible the time when, by the efficient utilization of our varied and vast resources, in all parts of the Empire, the British family can be made independent of foreign nations in respect to the material demands of life and civilization. To any thinking man the present European war, with all its paralyzing effects, provides ample justification for the propaganda of preferential trade, to which the late lamented Right Hon. Joseph Chamberlain gave so much of his strength and splendid ability in the declining years of his illustrious life. The work of this great Imperial statesman will live, and in the end it will triumph. To secure practical results we must, in many lines of manufacture, face tariff revisions in Canada and elsewhere in the Empire, and the motherland must, as I have already stated, adjust her trade policy to meet the situation. Products which in the past the United Kingdom has imported from Germany and other foreign countries can, under a sane and statesmanlike policy, be supplied by the overseas dominions and colonies, and vice-versa. Much that we in Canada, for instance, buy from foreign manufacturers can be "switched" over to our own kith and kin within the bounds of Empire.

In my own business, that of iron and steel, there are great possibilities for extension into new lines of the more highly finished goods, which until now have been imported principally from the United States and Germany. Such a change would serve to keep our gold circulating within the borders of the Dominion, instead of being sent out to enrich our friendly or unfriendly trade rivals. To accomplish this, however, our Government must undo past serious mistakes of shortsighted "statesmanship" and establish a tariff for self-preservation, one suitable to the times and that will serve to encourage the legitimate development of our material resources. This is the only possible policy for us if we are to lessen our imports and establish something like an equilibrium in our international trade balances.

* * *

Numerous Openings for Capital and Enterprise in the Maritime Provinces

By J. E. Parker, Amherst, N.S.

The great basic industries of the Maritime Provinces afford splendid opportunities for the development of trade within the Empire, and we are especially favored with transportation facilities. The great difficulty that has always stood in the way has been lack of capital coupled with a lack of that enterprise which makes for the development of new lines of industrial activity. These provinces are rich in agricultural possibilities, lumber, iron, coal, gypsum and other minerals, and their fisheries are of enormous value. Natural gas is found in New Brunswick and is believed to exist in Nova Scotia. There are enormous beds of valuable oil shales. New Brunswick and Nova Scotia have valuable water powers. Both are thoroughly intersected by railways, and have a great length of coast line with fine harbors. At the present time a movement is afoot—it having been launched by representative men of all the Maritime Provinces at a great meeting in Amherst, and resulted in the organization of a Maritime Forward League—the purpose of which is to encourage development in every direction, increase production, and find new and profitable markets for Maritime Province products. The changes brought about by the war have led such corporations as the Dominion Iron and Steel Company and the Nova Scotia Steel Company to make a strong effort to find new markets on the other side of the Atlantic and in South America for articles which hitherto have been produced by countries in the present war zone. The possibilities, even in manufacturing, for outside markets, are shown by the fact that nails and brass goods, manufactured in St. John, have, for some years, been exported to Britain, Australia and other distant markets. The products of Maritime Province industries are sold throughout Canada, and the development of profitable foreign markets is merely a question of capital, of proper representation in those markets, and the production of lines of goods such as they have been in the habit of getting from countries which for the present—and for a long time to come—will not be in a position to supply the goods.

With regard to the lumber industry, there are excellent

opportunities for the development of the pulp and paper trade. Enormous quantities of pulp wood are available. Every year the provinces of New Brunswick and Nova Scotia export hundreds of millions of feet of lumber in a roughly manufactured state. There is no reason, except the lack of capital and enterprise, why a much greater variety of woodworking industries should not be established—exporting the products in a more highly finished state. There is also an abundance of hardwood, in birch, maple, and beech, which is practically not used at all for manufacturing purposes. The manufacture of furniture is one branch of industry that is capable of development; and there are others.

* * *

Why Not Lead Pencils?

By John H. Shaw, North Bay, Ont.

I wonder whether it has ever occurred to any of our manufacturers that there is an opportunity now for making lead pencils in this country. Hitherto nearly all the lead pencils we have been using have been "Made in Bavaria." Why not lead pencils "Made in Canada"? We have an abundance of graphite and other materials required in their manufacture, and I can see no reason why this industry should not be made worth while.

* * *

"German Goods for Germany and the Overplus for the World"

By D. Garner, Winnipeg, Man.

Germany's success in trade was attributable to two fundamental reasons. The first of these is that Germany made a rule of—**German goods for Germany, and the overplus for the world.** In the second place, they brought scientifically-trained men, with scientific methods, into every trade problem.

Canadian manufacturers need not expect sentiment to influence business to any extent. If the Canadian public can buy goods equal to or better than those obtained from outside sources at the same price or lower, they will get the business; otherwise they will not. Never yet has a wave of sentiment created by conditions such as are prevailing at the present time upset fundamental economic laws. It behoves the Canadian business man and manufacturer, therefore, to grasp the present opportunity and bring science, efficiency and economy into the operation of his business. With this opportunity behind it, the trade of Canada will increase rapidly. Established on a sure foundation, it should grow in the same way that the trade of the German nation grew before this great calamity occurred and shut off Germany from the world's markets.

* * *

The Methods by which Germany Built Up a "Huge Foreign Trade"

By R. O. Wynne-Roberts, Regina, Sask.

I can only reiterate what I have urged in many quarters for the last ten years, namely, that there is need for a united effort to extend and retain the business of the Empire. I have observed the efforts put forth by Germany, the United States and other countries to secure orders in Canada and other parts of the Empire, and also the co-operative measures taken by them with a view to fostering trade. I appreciate the fact that the Department of Trade and Commerce at Ottawa is encouraging manufacturers and merchants to extend their operations.

The Foreign Office and Board of Trade at London, England, recently issued a Diplomatic and Consular Report on the trade of Germany in 1913. The essence of the report is that combination, syndication and concentration were the noteworthy features of Germany's commercial organization. With such measures Germany was able to build up a huge foreign trade, the expansion of which was phenomenal. May we not attribute this to the features enumerated above?

That there is scope for more united action in Canada can hardly be doubted. It must be remembered that the bitterness of the present moment, due to the conflict in Europe, will soon be forgotten in the commercial world. Buyers will continue to purchase goods in the cheapest market; and if Canada does not organize her forces in conjunction with other parts of the Empire, imports from foreign countries in time will be as great as ever; whereas the Empire, with its great resources, should be able not only to satisfy its own requirements, but also to meet a considerable proportion of the demands of other countries.

* * *

Freer Exchange of Information Between Canadian Manufacturers

By W. M. Currie, Hamilton, Ont.

I feel that the most effective method of developing our trade, more particularly in Canada, is for Canada to make every effort to deal with Canadians. Frequently we have found that while we are capable of manufacturing certain lines of material, and willing to manufacture them, a great many manufacturers, on account of their old connection, would rather deal with some foreign house. I would suggest that purchasers of manufacturing material having an order to place endeavor first to find out if there is not somebody in Canada who can meet their requirements. If they succeed in getting in touch with some firm who can do so, their next duty is to give that concern as much possible information concerning the quantities required, the prices to be met, and so on. Not only will this promote trade within the country, but it will give the purchaser a market close at hand from which he can always draw. If there were a freer exchange of information between manufacturers, we could develop much business between ourselves—business which would redound to the advantage of both Canada and the Empire.

* * *

Quality and Price Must Be Harmonized

By G. G. Drinkwater, Montreal, Que.

The average purchaser will always buy in the cheapest market, providing the articles are satisfactory. There is no getting over this fact: it is human nature. Therefore, while the strong feeling of loyalty which prevails just now is valuable because it awakens in British people the world over a keen desire to trade among themselves, this trade must be built up with two things always in mind—quality and price.

This harmonizing of quality and price is no easy matter in a country where the demand is necessarily limited. However, there are possibilities of export trade now receiving serious consideration. These possibilities, if realized, will help to produce that volume of trade in any one article which is so vitally necessary to cheap production.

Ten years ago the particular business in which I am interested imported about 90 per cent. of its goods; today about 80 per cent. is made either in our own Canadian factories or in other Canadian factories. That this remarkable change in the character of a business is not due entirely to sentiment must be very apparent. Only a sound constructive policy will build up a trade which is to live.

Let this splendid spirit of Empire stir us to action, and let us build with the idea that one day we will compete against the world!

Canada Equal to the Opportunity

By Walter J. Francis, Montreal, Que.

Canada, as a child of the family, has grown and lived happily, free from outside cares. Even the military work, the only element in which warfare is directly reflected, was not taken seriously. All this bears a striking analogy to the happy days of childhood. Now the opportunity for taking a place of responsibility and assistance in the great British family has arrived, and the child is asserting his manhood. It might be said that one of the most prominent evidences of strength is the number of valiant Canadians who have joined the colours. All respect and good wishes for those who have gone or will go. But many must stay behind, and by these great assistance is being and will be rendered. While our old lines of trade have been broken, much new work has come. I am informed that war contracts to the extent of two hundred million dollars have come to Canada since hostilities began. The manner in which one hundred and fifty of our manufacturing shops have taken up the manufacture of shells in the past few months is little short of marvellous. The ingenuity displayed in adapting railway shops, bridge shops and machine shops to shell-making, shows more clearly than almost anything else could have done, the ability of Canadian engineers to rise to opportunities. I am not at liberty to discuss some of the details, and I shall only say that manufacturing operations are now being performed in Canada which are not being done anywhere else in America. And I am informed that more opportunities are coming. Canadian materials and Canadian brains are measuring up to the mark. We are only commencing to realize the extent of our resources in men, in minerals, in forests and in water powers, and it is too early to even suggest the lines of Canadian development during the next two years. As an agricultural country Canada's reputation will increase, and as a manufacturing country her name will be made.

* * *

A Permanent Industrial Commission

By A. K. Grimmer, Medicine Hat, Alta.

The general industrial welfare of Canada has been lost sight of in our personal endeavors for individual locations. At the present time it must be realized that the manufactures which start with nature's products and produce by combinations the completed articles essential to a nation are those which should be fostered and developed. At the same time, these industrials must be protected so that the investor will obtain dividends in times of peace in competition with other countries, though such protection must not be such as will unreasonably affect the consumer.

Each locality should at this time study its own natural resources and their possibility of development—or rather the stage of manufacture to which it can successfully compete with other centres. This in Western cities is often regulated by transportation problems.

I believe that a competent industrial commission could do a great deal of splendid work. Individuals in any locality are often carried away with the ideas of a promoter, and much capital has been wasted all over Canada in the promotion of schemes which, through no other reason than the fact that there was not sufficient market available, have proved failures.

A large industrial movement originated in Medicine Hat some four years ago, and great progress was made in establishing industries many of which are on a sound financial basis, even today. There were others, however, which (although the raw product and cheap power were available) have been unable to make a financial success of their proposition owing to the fact that there was not the market available for the sale of their product in the territory.

It would seem, therefore, that if Canada had a permanent industrial commission to whom investors could refer for advice in investing their money, more confidence would be instilled into the public and a large development of the natural resources of Canada would result. This commission would further study local conditions, their resources and market, and point out to the community the possibility of the development of suitable projects. Further, from their studies they would be able to advise the Government independently in respect to the protection that manufacturers should have from foreign competitors.

* * *

Wood Block Flooring of Douglas Fir from British Columbia

By W. C. F. Gillam, Vancouver, B.C.

The universal cry, "Support Home Industries," is but the "inner wheel" to the larger ideal of developing trade within the Empire, but the architect in British Columbia (and doubtless elsewhere in the Dominion) attempts to confine his specification to local products. He is continually faced (in a great many cases) with the difficulty of obtaining the best in material or manufacture out of the world-wide field for selection.

In the writer's opinion, the "war cry" should be "Wake Up Manufacturers of Canada!" This applies particularly to the manufacturers of British Columbia. If the goods are produced that are demanded, the architects will specify them.

The question naturally arises as to what product Canada, as a whole, can produce that she is not producing now.

Take British Columbia as a lumber-producing province. Does it supply the wood-block flooring that is used so largely in the Old Country? If not, why not? Cannot British Columbia supply as good a wood block as Sweden, Norway or Russia? The writer has found from actual experience that it can. Douglas fir blocks are admirably adapted for the floors of public buildings, schools, etc., where a floor of good appearance, non-resonant, sanitary, and quiet to walk upon is so desirable. The new Normal School Building, at Victoria, for the Provincial Government of British Columbia, is an example. Here wood-block flooring of Douglas fir, grown and manufactured in British Columbia, is used throughout.

"Wake up you manufacturers of Canada, lest others reap while you sleep!"

* * *

A Market for Fine Tools

By J. W. Evans, Belleville, Ont.

There is a very large market for fine tools in Canada—small files, dental tools, watchmakers' tools, and small tools for carpenters, joiners, cabinet-makers, etc., a large proportion of which are at present imported from Switzerland, Germany and Belgium.

There is every opportunity in Canada for the manufacture of such tools, and many other articles.

We have cheap power, reasonably cheap labor, cheap factory sites, low taxation, and fine schools for the laborers' children.

Manufacturers make a mistake in locating in the large cities. There are a great many small towns and cities in Canada where the laborer can get good comfortable homes at reasonable rents, where there is an abundant amount of fresh air, where the best of schools are within easy reach, and where one can build his home on the instalment plan, and live much more cheaply. From the manufacturer's standpoint, power can be obtained at a lower rate than in many of the large cities, and the best of shipping facilities are afforded both by rail and water.

The present war has pointed the way for this new development, and we should take advantage of it now. Do not

wait until someone else leads the way and gets all the business. Let us take up this matter seriously.

* * *

The Right Goods and the Right Selling Campaign Required

By Peter Gillespie, Toronto, Ont.

Trade, nowadays, pays little attention to the flag. "The man with the right goods, at the right place, and with the right selling campaign gets the orders."

Of Canada's aggregate trade for the last fiscal year, 55 per cent. was with the United States, 35 per cent. with the British Empire and 31 per cent. with the United Kingdom. This, moreover, in the face of preferential tariffs. If, in the past, we have bought German clocks, or United States cottons, or French perfumery, or Belgian glassware, when similar lines were available within the Empire, it was not because we are disloyal to that Empire, but because the quality and the price and the manufacturer's desire to adapt himself to the customers' tastes have made the foreign purchases somewhat more attractive. In ordinary times there is little sentiment in trade.

"Our goods are made in these colors and these lengths, and those who are not pleased can go elsewhere." This, according to W. Harbutt Dawson, in "The Evolution of Modern Germany," was the reply given by a leading firm in a great English textile industry to a prospective purchaser who desired some modifications from prevailing styles. In due time the purchasers went elsewhere and now the problem facing this firm and others in like predicament is how to get those rebellious buyers back.

If a change of policy with regard to Canada's trade is to be brought about, it must come chiefly through the activities of the producer. His plant and his methods must be modern, he must attain excellence in his product, and he must advertise his wares. But if tradition and geography and environment are all arrayed against him, as they will be undoubtedly in certain lines, will he not be well advised if he leave to those countries more favorably situated than he, the task of supplying the world's demand in those lines? Notwithstanding this, there is in Canada an attractive field open to Canadian industry for the manufacturer with enterprise, having "the right goods and the right selling campaign."

* * *

Make a Scientific Investigation of the Import Trade

By A. J. Latornell, Edmonton, Alta.

Without a doubt there are great possibilities of developing trade within the Empire. The volume of foreign trade now being done, and the still greater volume transacted prior to the outbreak of the war, is an indication of this.

We now have an opportune time to set about increasing our trade with the various parts of the Empire. This must be undertaken in an intelligent manner, however, otherwise our efforts will meet with failure. At this time we might succeed in selling unsatisfactory goods, owing to the fact that no others were obtainable, but such a trade would prove detrimental, as we should inevitably lose it when conditions returned to normal. The proper thing to do is to ascertain what each country imports and the country from which it is imported, and then study the article of trade in order to ascertain just why it meets the demand in that particular country. The article may have some particular feature in its manufacture, or its recommendations may be only of a trifling character. Price is always an important consideration. Trade relations are best maintained and improved on the principle of an honest article at an honest price.

As far as Canada is concerned, my idea of the best way

"Canada's Industrial Opportunities in the Light of the War"

TEN DOLLARS FOR PRIZE LETTER

The Canadian Woodworker offers a prize of $10 for the best letter containing in not more than 500 words a summarized criticism of the contributions by Sir George Foster and others published in this issue.

The award will be made not by the standard of literary merit but upon the basic value of the ideas contained in the letter. It is desired particularly to suggest ways and means by which the Canadian woodworking industries may be developed.

It may have occurred to you that Canada should take certain steps to promote the home manufacture of certain imported lines with which you are identified in your work. If so, let us hear from you. You cannot fail to have some ideas, and you can enlarge upon these by a careful reading of the contributions published in this issue. We direct attention particularly to the letters by Sir George Foster, W. J. Beattie, and E. T. Nesbitt. There is plenty of food for discussion in these.

The prize-winning letter will be published in our April issue, and the latest date for receiving letters will be Tueday, April 6. Here is an opportunity for some of you men with ideas. Let us hear from you.

Mark your envelope "Prize Letter Contest."

Remember the closing date, APRIL 6.

of developing trade is to place in various centres a sufficient number of properly trained and intelligent men (not politicians) to study this problem and report upon it. To flood any country with sales agents, until the requirements were known, would be unwise. An intelligent, persistent campaign would produce results, and for a country with such resources as Canada the possibilities are boundless.

* * *

The "Possibilities" which will Follow the War

By L. G. Chiozza Money, M.P., of the British House of Commons

The war has revealed to us that owing to the neglect of British investors, some new industries have not been taken up and other old ones have languished. After the war a greater proportion of investment will be made at home. If the Government does its duty, it is certain that British capital investments will increase.

I am asked where the stimulus of industry is to come from. Here is a category:

1. Much reconstruction will take place on the Continent after the war, and Britain, as one of the three chief manufacturing countries, must be called upon for much material. This is a passing phase.

2. Although war does not disable a country as long as it is commonly supposed, Germany for some time after the war will be greatly handicapped in her competition with us—and German competition is the fiercest we have to encounter. This should enable our industrial captains to strengthen their position and recover lost ground.

3. The war has revealed to an astonished nation that we have neglected important industries. That neglect will be atoned for, so that after the war we shall gain new industries, and improve old ones.

4. It is probable that the deplorable vogue of overseas investing will be checked by the war, and that the new national spirit which has arisen will lead to the enlargement of the scale of our industrial operations.

5. The Government has been forced by the conditions of the war to interfere in industry to save individualism from itself. When the war is over it will be impossible for the old neglect of essential interests to obtain.

Among the most valuable woods imported for use in the cabinet trade are satinwood and amaranth, which cost approximately $400 per 1,000 ft.

The British War Office approves of "made-in-Canada" goods, according to the following Canadian Press despatch, dated January 12th:—

"William L. Griffith, Secretary to the Lord High Commissioner in London, says in a statement to the press regarding the British purchases of war equipment in Canada:—

"In the past few weeks British orders placed in the Dominion have amounted to between $25,000,000 and $30,000,000. The French and Russians have also placed large orders in Canada."

A correspondent of an English lumber journal writing from India describes an experiment in coloring artificially the wood of trees while in a growing state. By running a system of boreholes right through the trunk, stopping one end with cork, and introducing a dye, the tree may, it is asserted, be made to absorb the coloring matter. Thus the aniline dyes of malachite green and methylene blue colored birch evenly, and eosin veined the wood with red. As the darker shades in wood have a higher value than the lighter, it is considered possible that by impregnating, for instance, a tannin-free wood like birch or maple with a tannin solution during growth, it would later be easy to give these woods a rich dark tint similar to that of the oak, which is rich in tannin, by means of treating it with ammonia under pressure.

Wood Imports From the United States

The accompanying table shows the principal imports of woods and wooden articles from the United States in the year ending March 31st, 1914.

Barrels	$ 273,680
Cane, reed or rattan	70,260
Caskets and coffins and metal parts of	59,214
Cork wood and bark and mfrs. of	276,151
Doors	476,193
Felloes of hickory or oak, not further manufactured than rough sawn or bent to shape	79,861
Fence posts and railway ties	2,326,843
Fuel wood	89,936
Furniture	2,660,071
Handle, heading, stave and shingle bolts	219,032
Handles—	
Ash	32,763
D shovel	71,044
Hickory	72,091
Hickory billets	69,995
Hickory and oak spokes, not further manufactured than rough turned, and not tenoned, mitred or sized	231,328
Hub, last, wagon, oar and gun blocks, and all like blocks or sticks, rough hewn or sawed only, and scale board for cheese boxes	74,893
Ivory nuts (vegetable)	70,222
Lasts of wood	85,698
Logs and round timber	648,200
Lumber, timber, planks and boards—	
African teak, amaranth, black heart, ebony, boxwood, cocoboral, dogwood, lignum vitae, persimmon, red cedar and satin-wood	26,235
Cherry, chestnut, gumwood, hickory and whitewood	774,658
Laths	82,308
Mahogany	282,487
Oak	2,629,788
Pitch pine	2,912,363
Sawed, split or cut boards, planks and other lumber, when not further manufactured than dressed on one side only	4,423,345
Sawed boards, planks, deals, planed or dressed on one side or both sides, when the edges thereof are jointed or tongued and grooved	508,126
Shingles	102,622
Spanish cedar	74,548
Staves of oak, sawn, split or cut, not further manufactured than listed or jointed	181,624
Timber hewn or sawed, squared or sided or creosoted	521,825
Walnut	28,691
White ash	119,552
Matches	47,255
Mouldings	154,427
Refrigerators	55,256
Show cases and parts of	50,289
Veneers	284,497
Window sash	71,239
Wood pulp	233,806
All other wood and mfrs. of	1,949,574
Total wood and mfrs. of	$23,401,890

Fuming Oak Furniture

Contributed by W. J. Beattie, Owen Sound

THE Finishing Room of the furniture factory is quite as important as any other section, but it is not generally so regarded. It is in this department that the appearance of the product can be either enhanced or made to look quite the opposite. Being the last of the operations, and usually the one most hurried, it behoves the manufacturer to see that he has not only good material but the best possible appliances for quick and lasting results, so that when the goods get into the hands of the consumer, satisfaction will be certain.

Take the fumed oak which is now so much in vogue, and which is quite capable of giving lasting satisfaction to the customer if properly done. This is produced by two different methods: the fuming box, and by stains applied in the usual way with a brush. The former is the only satisfactory method, and in fact is the only way to produce a fumed finish. Any other is a sham, and anyone buying such and thinking he is getting genuine fumed finish is being deceived. The fuming box produces a color that is driven into the wood by the strong fumes of ammonia to a depth of an eighth of an inch or more. This can easily be proved by cutting some inconspicuous part with a knife, which will reveal its genuineness. The brush fume work does not so penetrate, in fact it is just the same as any other stained work.

Goods that are box fumed are usually stained with a brownish water stain, strongly charged with liquid ammonia. After this has dried, they are placed in an air-tight room and liquid ammonia is allowed to flow into the chamber in such a manner that it slowly evaporates and charges the air intensely with its fumes, which drive the stain into the wood, and which of itself will give the articles a yellowish brown shade. The room is left tightly closed for several hours; some factories leave the pieces in overnight. The ammonia fumes are removed by a ventilator, and if a compressor is in use in the factory, it is a good idea to have a pipe connected with the fuming chamber, which will force the fumes through the ventilator in quick order, thus enabling the finisher to open the chamber in shorter time.

The goods are then sanded smooth with fine sandpaper, and shellaced with white shellac, thinned to about one-half the usual consistency. Then they are sanded and shellaced the second time, and toned with a spirit mixture to produce an even shade where needed, then waxed with a mineral wax, which is allowed to remain a sufficient time, and wiped off. With this the article is ready for trimming and packing. As will be seen, the process is not long, the labor being a much more important item than the material, so far as cost is concerned.

For real good work a process something akin to French polishing is followed, but the grain of the wood (oak) must be left open; that is, not filled up as is done in regular French polishing, or rubbed varnish finish, as it would to a great extent spoil the effect desired. All that is required to keep fumed furniture looking as well as ever is to give it a coat of mineral wax and rub off.

In a factory finishing room where the pneumatic rubbing machines are used, it is a good idea to have one of these machines fitted with sandpaper blocks to sand the large surfaces of goods after they leave the fuming chamber, before the first coat of shellac is applied. This saves considerable time and labor, and the use of fine worn sandpaper from the sand belt machines in the factory for this purpose will cut the sandpaper bill very perceptibly.

The construction of a fuming box for a finishing room is not necessarily an expensive proposition, though it would be money well spent to do it more thoroughly than most factories see fit. The size required depends on the kind and possible quantity that will be put through under normal conditions.

A frame work can be erected in a convenient part of the finishing room, of the determined size, and about eight feet high. Cover this with heavy canvas or duck, provide for a good tight fitting bevel-edged door, and give the canvas covering several liberal coats of paint. Have a shelf at the side or at one end about five feet from the floor, outside, on which to stand the covered iron vessel containing the ammonia, the flow of which is controlled by an iron ammonia valve fitted to an iron pipe leading from the tank, through the wall of the fume box. The ammonia is allowed to run slowly down an irregular galvanized iron incline, evaporating as it goes, and thus performing the fuming process. The amount used and the time the goods are to remain in the box is decided by a few trials for the required results. The usual amount of ammonia required runs from a quart to a gallon.

In a future number the writer will give the results of various experiments along this line for the benefit of the readers of the Canadian Woodworker.

Points to Remember in Rubbing Varnish

Contributed by B. A. Lake

TOO often it happens that the rubbing of varnish is left to a cheap man on the assumption that it is merely a mechanical operation and does not require so much skill as patience and ability to keep up one kind of motion for a prolonged period. True, the operation does require these qualities in the workman, but unless it is posible for the foreman to keep an eye on him all the time he will not perhaps know when to stop, which is apt to mean a partial removal of the varnish coat. This is not the object of rubbing at all, but to level the minute roughnesses of the surface. The fine pumice powder generally used in rubbing is an abrasive, though admittedly a slow one, and the depth to which it will cut depends only upon the endurance of the man using it. Therefore, it is important to get a man for rubbing who not only has endurance and patience but also some intelligence. Cutting through is much more likely to occur

when using oil, unless the varnish is perfectly set. When using water, use it freely and see that it is cold, for nearly any user of finished work, not to speak of the finisher, can relate from their experience the comparative effects of hot and cold water on a varnished surface.

Perfect drying between varnishing and rubbing and between rubbing and varnishing is essential, and all powder must be carefully cleaned off after each rubbing. The time for drying varnish ready to rub depends upon climatic conditions, and here is another instance of the necessity for employing a man on the work who has judgment and the ability to use it.

Light in the Finishing Room

NOW and then someone raises the question of light in the finishing room, or rather that phase of the question covering the effect of light upon the drying of finish, says a writer in The Furniture Manufacturer and Artisan. There are some finishers who will contend that light is just as essential as air to proper drying, and that varnish will dry faster in a well lighted room during daylight than it will at night. Others take a different view of this matter and insist that the drying out of varnish and other finishing materials is purely a matter of temperature and air circulation and that the light has nothing to do with it. There is room for argument on this question, perhaps, but there are other points about light in the finishing room well enough established to require but little argument. One of these is that good daylight is essential in staining if one would maintain uniformity in stain shades, or stain with any degree of exactness whatever shade is wanted. The ideal light for this kind of work is the same as the ideal light for the artist—light coming from the north side so that it will remain practically uniform and not vary materially with the passing of the sun as when the light is received from any of the other three sides. Another thing we know is that sunlight shining directly on either unfinished or finished woodwork has a tendency to bleach out and deaden colors. Therefore the direct rays of the sun should be avoided if one would get and keep the right kind of live color tone in finished work. To keep finished work fresh or even prepared woodwork before the finish is applied, it should be stored in a dark place, and especially protected from sunlight From all this we may safely argue that light is an excellent thing in the finishing room, as it enables one to judge stain shades better, and also makes for greater skill and more satisfactory results in spreading varnish and other finishing coats. Also it will perhaps be accepted without argument that daylight is much better for this kind of work than artificial light. The electric light people are making wonderful progress, however, in artificial light, and may soon be able to furnish something practically as good as daylight They are not likely to furnish anything better. So the ideal finishing room is one that is well lighted, that is well provided for receiving daylight, preferably from the north side. When it comes to drying, either in the finishing room, or in any specially provided drying room, some actual value of light will have to be demonstrated before it will receive much consideration, and the main factors to provide for are temperature, air, circulation and a conditioning of the air so that it will carry the same percentage of moisture all the time.

The First Aid Column

THE Finishing Room department of The Canadian Woodworker is designed to furnish everyday assistance in the practical rendering of the job. We are glad to note that a number of our readers realize this, and we take pleasure in submitting the following queries. We trust that our readers will co-operate with us by replying to such questions upon which they happen to be particularly well posted as a result of their experience in the trade. We want every reader to get the maximum value out of this department, and in return we ask only for a reasonable degree of co-operation.

Send in the solution of the problem as it appears to you. Never mind if there are flaws in the solution—that will be for the other fellow to find out and tell us about.

Finishing American Walnut

I would appreciate pointers on the finishing of American walnut. What I am aiming at is the dull finish which seems decidedly popular at the present time. Can any readers of the Canadian Woodworker who have had experience along this line supply me with information on the subject?—**A. W. Henry.**

* * *

Humidity in the Finishing Room

How shall I provide for the humidity of our finishing room air? I have heard that it is necessary to keep up the moisture content in the air, and I would appreciate some information upon the method of doing this, and also on how to determine when the humidity is right.—**"A Finishing Foreman."**

* * *

Varnish Troubles

I have had considerable trouble with some mahogany finish toilet frames. The wood used is birch, and we have been dipping in water stain, rubbing down, and then applying two coats of shellac, finishing with two coats of varnish. The varnishing is done in a room at a temperature of between 80 and 90 degrees Fahr., and both coats are allowed to become hard to the touch before any further work is done. Yet many of these pieces are marked by the corrugated boxes in which they are packed, although covered with tissue paper and a wrapper of kraft outside. What would be the most likely cause of the trouble?—**A. H. Fisher.**

* * *

Arrangement of Finishing Room

We wish to use the top floor of our factory, which is about 30 by 40 feet, as a finishing room for small cabinets and store window showstands. The woods used will be chiefly oak, with some birch to receive mahogany finish. There will also be a proportion of figured red gum. How should this floor be divided up and also what special heating and ventilating will be necessary? What would be the best method of arranging storage for materials, and what quantities would it be most economical to keep on hand?—**Larcombe Cabinet Company.**

With the co-operation of the reader, we propose to make the First Aid column a permanent feature of the Finishing Department—a department within a department, to which the foreman finisher, rubber and brush hand alike can turn when they run across any snags. The Canadian Woodworker does not offer a sovereign

remedy for every form of trouble experienced, but it does undertake to give the best of its own experience and to institute inquiries which will bring out that of others.

What Caused the Oozing Out?

THE oozing out of a supposed "gum" from a finished bed of red gum recently puzzled a furniture man, who believed there was no gum in the wood. It is right to say there was no gum in the fibres of the wood in the first place. But the thing that was oozing out was no doubt put into the wood in the finishing rom. The writer, of course, does not possess any positive knowledge of how this bed was finished, but from what he has seen of this kind of thing he thinks he has a pretty good idea, and will therefore dare to presume.

No doubt this bed was stained with an oil stain, and the wood being soft and absorbing, and there being a real heavy coat of the stain put on, it penetrated to a considerable depth. Then it is just possible that the finisher is not allowed very much, if any, time to play on, and is finishing his goods in the quickest possible time, and the coat succeeding the stain coat was put on before the stain was thoroughly dry. In process of time the stain that was far in the wood began to generate a gas, and the gas forced its way to the surface and raised the finish. Then more gas was generated, and this forced the stain to the surface. This we call oozing out.

The use of all stains must be attended with great care, both in the application and the drying afterward. Especially is this care necessary on soft, absorbing and open-grained woods. If a heavy coat of stain is applied and then shortly afterward the surface is coated over, or the pores filled up so that the air is excluded, the drying process is practically brought to a standstill, and sooner or later trouble is bound to ensue.

In staining with an oil stain use a fine brush. A coarse brush will let the stain out too easily and quickly. Brush the stain out as evenly and rapidly as possible, so that it cannot penetrate too deeply in any one place. Then give plenty of time to dry. This is very important with all stains, whether oil or water. If the foundation is hurried to the limit, there is a danger that the limit may be exceeded and cause plenty of trouble.

When a finisher is up against a job like this, what is the best way to fix it up? At the outset let me say that if you want to fix it right, don't try any more short cuts. If the finish is discolored where the stain has oozed out, the only way is to have the surface scraped off, allow it to stand for twenty-four hours, and then refinish in the usual way, only give plenty of time for everything to dry.—Ralph Curtis, in Veneers.

Foreman Finishers!

You are invited to make the fullest possible practical use of the First Aid Column. Let us hear about your troubles and we will give you the best in our experience.

Hot Water in the Finishing Room

No finishing room can claim to be fully equipped unless it has a hot water vat. Facilities for heating water in the finishing room were not known a few years ago, but the modern finisher would find it difficult to get along without them, writes C. M. Barnes in the Wood-Worker.

It seems but a short time since every pint of hot water we used in our finishing room was carried up from the boiler room. To-day we have facilities for heating a pail of water by itself, in a few seconds, as well as a vat which always contains hot water, and which, by merely opening a steam valve, may be raised to the boiling point in little more than a minute. Here the men get the water for washing up before leaving the factory, the rubbers get warm water for rubbing, and the stainer for mixing his stain. It is to this vat the stainer goes when he needs heat to help dissolve oil stains when it would not be wise or safe to use fire. One never knows how valuable a constant supply of hot water is in the finishing room until he has it there; and every finisher should have it.

Practical Points on Varnishing

Observe cleanliness in every stage of the work—clean pots, brushes, clothes, room, work, varnish, etc.

Have brush the size best suited to the work; if too small for the size of surface, there will be brush marks.

Heavy-bodied varnish should not be brushed out much, but be applied in a full coat, being flowed on.

Varnishing requires warmth until it has become perfectly dry, this in order that it may not become chilled in cool weather. To varnish a job and then set it in a cool or cold room means disaster to the finish and wearing qualities.

* * *

Varnishing is not an easy task, where one expects the best finish. Many house painters do not know how to apply it, and if they could watch a carriage painter using it they would get some good pointers, no doubt. It should be applied freely, with a full brush, not with a partly filled brush, as though trying to stretch it out; do not work the varnish more than necessary to produce a level and even surface. The less working with the brush the better. Yet, in making this full application, be careful to avoid runs and sags. Very much will depend upon the varnish, but more on the workman. A free flowing varnish will permit of applying a very full coat, and allow the workman to work or brush off the surplus, using very gentle strokes with the brush, using only tips of the brush.

The new finish that has recently come out for the figured red gum veneer is a mild shade of brown, just a little darker than the natural color of the wood. It is made with the ordinary brown stain known as walnut stain. Dissolve a quantity of walnut crystals in hot water, and then reduce to the desired shade. The shade is very light brown. After the stain is dry, coat with bleached shellac, and body up the usual way for dull rubbed finish.

Tupelo lumber is being boosted as a material for boxes and cases. It is said to be cheaper than most kinds of wood hitherto used for the better class of boxes, and is much more even in texture than pine.

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Chapter 2—*Manufacture of Glue*
Chapter 3—*Testing and Grading*
Chapter 4—*Methods in the Glue Room*
Chapter 5—*Glue Room Equipment*
Chapter 6—*Selection of Glue*

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Veneers and Panels

Making Swell-Front Standards for Couch Ends

IN the manufacture of the curved standards so often used at the present time on the ends of bed-davenports, where there are no facilities for bending lumber to the shape required, it is equally economical to build up a core of narrow pieces of almost any dry lumber, although chestnut is preferable, as in all cases where a non-warping core stock is

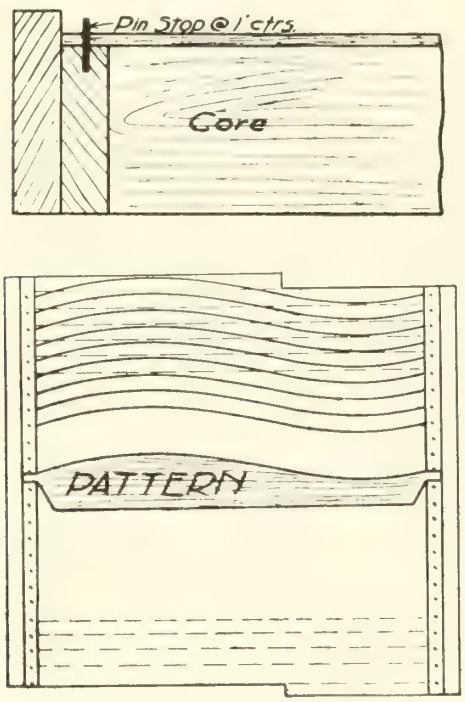


Fig. 1—Laying out curves for bandsawing.

required. This core may be built up to a thickness almost equalling that of the width of the finished standard, and the width of the core may be as large as it is possible to put through the planer, as it is necessary to dress to neat thickness after gluing up. After planing, unless the dressing is very good, it will be necessary to sand the two faces of the core before gluing and laying the veneer. The face veneer that is laid on the core at this time will be on the edges of the standards in the finished product. Where large quantities are to be made it is a good plan to trim the ends of the solid block after veneering and to tack on the ends two strips with pins at a spacing equal to the thickness of the finished standard (see Fig. 1). These pins serve as stops for the pattern by which to lay out the curves for band sawing. As each piece is bandsawn it is laid with the previous piece in the same position in which it was cut from the solid block, so that when the time comes to veneer the faces of the standards, the one standard serves as a form for the veneer of the next. It will be noticed in Fig. 1 that at the end a short block is glued to make that portion of the swell that projects beyond the perpendicular line from the top of the standards. This affords an opportunity in getting out the core to use up short ends of material. When gluing the curved surfaces for veneer, apply freely on the steepest portion of the curve on account of the end grain which will absorb more glue than the flat grain on the other parts of the surface. As each piece is veneered lay out in position by its fellows and clamp as quickly as possible. For an average curve of this description four clamps will be necessary.

As it is probable that some veneer and glue will project beyond the edges, the trimming of this waste will afford somewhat of a problem in order to avoid marring the veneered edges with the saw. Fig. 2 illustrates a convenient method of trimming so as to overcome this difficulty. The projecting pins on the sliding form touch the edge of the standard between the overlapping veneers, so that as the form and the veneer stock are moved together the outer edges are trimmed. When all have been trimmed on one edge it is only necessary to run the trimmed edge against the fence in the ordinary way.

In sanding it is preferable to use a vertical oscillating spindle, in a table on account of the risk of cutting through the veneer at one side, which is likely to occur unless there is some means of holding the stuff square. Of course, such work may be done on the jobbing sand belt at the point where it runs over the

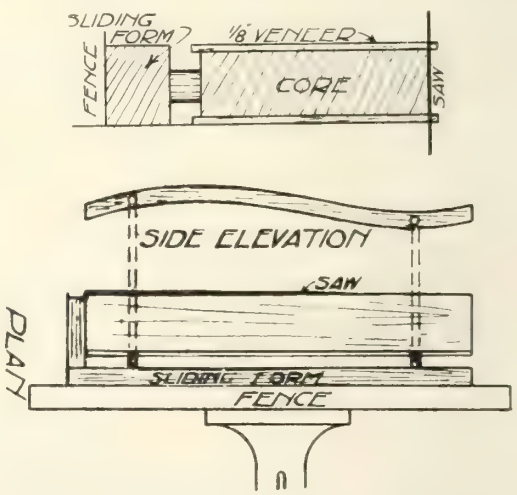


Fig. 2—Trimming off rough edges of face veneer.

pulley, but it would require a careful man to do the sanding in this way.

In getting out the core stock, which would be from 3½ ins. to 4 ins. wide, it is possible to use up even small stuff by gluing up single blocks 3½ ins. wide or whatever thickness may be required, and dressing these blocks and gluing together in the second operation to form the thick block.

The Russian Government has placed an embargo on all kinds of lumber, to prevent its exportation; walnut lumber, including Circassian walnut, much prized by American furniture makers, is specifically mentioned.

An Interesting Discussion on the Merits of Sound Wormy Chestnut in Piano Case Work

THERE is considerable speculation regarding the use of sound wormy chestnut for veneer cores. This wood has found a wide use as core stock for furniture and panel work, but it is held by some that it does not make a good foundation for the high grade and usually thin veneers used by piano-case makers. The divergence of opinion is interesting, as it is not only necessary in the interests of good work to know the application of such material, but it is essential to know its limitations. Quite recently we received from one of our readers the following query:

> The writer would be pleased to hear from users of sound wormy chestnut for veneer core—as to its merits or demerits, particularly in the building up of piano cases. Is the use of this class of stock accountable for checks or flakes showing on the veneered surface after the product has been finished, provided the stock has been thoroughly dried before veneering?

It occurred to us that a profitable discussion might be instituted, and so we invited expressions of opinion from a number of firms whose replies are given below. If any other readers have special pointers to offer we shall be glad to hear from them.

Hardwood Dealers Sell Three Grades of Chestnut for Cores

While we handle large quantities of chestnut, we do not work the stock ourselves. Therefore, we do not feel as competent to reply to your query as those who actually use the stock in their factory. However, in calling on the trade we cannot help but absorb information given to us from time to time by our customers who do use this wood for veneer core purposes. The adaptability of this kind of chestnut is governed considerably by the thickness of veneer used. Manufacturers of desk furniture and other articles in which the veneer used is 1/20-in. or thicker, experience no difficulty at all in the use of sound wormy chestnut as a core material. At times, however, where a very thin veneer, such as 1/28-in., is used, difficulty has been experienced by some of our trade along the lines suggested in your letter: that is, in the use of this exceptionally thin veneer, checks or flakes may develop in the veneer after the product has been finished. To overcome this difficulty some of our customers are cross-banding the wormy chestnut core with a veneer of poplar; in other instances they have abandoned using the sound wormy grade and are using firsts and seconds instead.

In summing up the matter, we would say that where exceptionally thin veneer is used, first and second grade chestnut would be more satisfactory for core purposes than the sound wormy grade, and where sound wormy chestnut is used cross-banding with some other wood, such as poplar, would make it satisfactory. With thicker veneer there should be no difficulty at all in using sound wormy chestnut.—**Hugh McLean Lumber Company, Buffalo, N.Y.**

Chestnut Core Stock Should Be Well Dried

We are in receipt of your communication regarding the use of sound wormy chestnut for cores. We wish to state in this connection that while some people use other wood, such as white pine and poplar in the lower grades for core stock, it is conceded, we believe, that chestnut is far and away the best wood for this purpose. For years we have been selling all of our sound wormy chestnut largely to piano and furniture manufacturers, who use it for veneering over, and there is also a great deal of this wood now being used by the sash and door manufacturers for cores. It is, of course, necessary that all core stock be thoroughly dried, preferably kiln dried, before putting on veneers, and as chestnut will surface perfectly smooth there is no danger whatever of checks or flakes showing on the veneered surface after the product has been finished. The numerous small worm holes always found in this grade of lumber make it more desirable for core purposes, as these worm holes fill up with glue and help to hold the veneer.—**W. M. Ritter Lumber Company, Columbus, Ohio.**

Poplar or Whitewood is Better Than Sound Wormy Chestnut

We have received your query in regard to sound wormy chestnut, and in reply would say that there are a great many piano concerns who use this class of wood. We doubt the advisability of using this wood for this purpose, for the reason that poplar or whitewood is so much better, in our opinion. However, if it is used, it should be of the grade known as No. 1 common and 1st and 2nd sound wormy, so as to get away from wind shakes as much as possible.—**Vansant, Kitchen & Company, Ashland, Ky.**

Core Stock Must Be Free From Large Indentations

Regarding the use of sound wormy chestnut as core material for piano case work, it is our opinion that this is first-class wood to use for cores, but they must be made from lumber that is free from grub holes, knots, and any other indentations, as after the core is veneered and the piano is finished any slight indentation will show. You do not give full enough particulars of what kind of checks or flakes are showing in the veneered surfaces, but there are several kinds of both, which have different causes.—**"Piano Manufacturer."**

Cauls Should Not Be Overheated

Regarding the use of chestnut for core stock, as far as I know this sometimes checks through overheated cauls, as when the veneer is applied and the wood cools off, the contraction starts checks in the veneer which are not noticed until after the finish is hard.—**"Furniture Foreman."**

One Piano Manufacturer Had No Success With Chestnut

We have used some of the sound wormy chestnut stock referred to in your query, but not with much success. The expense for filling the worm holes and making the surface is more than the cost of other kinds of lumber and so we discarded it. We are sorry to be unable to give you a better report, but we do not believe that this class of chestnut is of much use for anything other than coffins.—**W. W. Kimball Company, Chicago, Ill.**

Few men hold such a responsible position as the man in charge of the laying out in a large sash and door factory, or a special mill work factory. No matter how careful the machine hands may be, nor how speedy, if the lay-out man is not absolutely on to his job, their labor is in vain, for the bench men cannot assemble doors if a mullion is longer than the distance between the two rails. And when it comes to panelling such places as open string stair-cases, there is a still greater opportunity to lead the machine men astray by wrong lines, and thus render the assembling of the finished panels a matter of impossibility for the bench hands.

Enterprising advertisers of furniture have lately taken up a new idea and instead of striving to conceal the fact that a product is a veneered one, they are

proudly announcing this and making capital out of it. They point to their table tops, for example, as being better than the regular sawed lumber, because they are made of reinforced or built-up lumber, with the plies crossing so as to give greater strength and to reduce the tendency to shrink and warp. Reinforced construction is the latest advertising phrase for veneered tables.

The Use of Mechanical Spreaders for Gluing Thin Veneers

EVER since its introduction the mechanical glue spreader has been the cause of controversy among manufacturers of veneer stock. Of course, it has always been conceded to be more economical in the matter of time, and more efficient, because the glue is applied so quickly that there is no chance of part setting before the veneer is applied, as would be the case with large surfaces when the brush method is used. On the other hand, champions of the brush method claim that it is not possible to adjust the quantity of glue applied according to the grade of veneer. There is no question of the evenness of the glue coat, but whether the veneer be porous or close grain, the quantity applied by the roll spreader is always the same.

The following query we received on this subject opens up a field of discussion equally as wide as that of the use of sound wormy chestnut as a core stock.

> Will piano makers kindly furnish the writer with the benefit of their experience with the glue-spreader, particularly in the line of four veneers at one operation. It is reported that some piano makers have tried the spreader and have thrown it out as an undesirable tool. The reason for this would be helpful.

With the idea of getting useful information on this question, we submitted the query to several firms, including both manufacturers and users of glue spreaders. We give herewith their replies:—

The Mechanical Spreader Favored as a Glue Saver

Referring to the query on the subject of the use of a glue spreader on piano work when laying four veneers at one operation, we may say that we have been gluing five-ply stock with the mechanical spreader for many years, and we think it is the only practical and economical manner of spreading glue on veneer stock. The spreader does the work quickly, so that the glue does not get set before the pressure is applied. Also the glue is laid much more evenly than by hand, and the spreader, therefore, is a glue saver. We have never heard of any person discarding a glue spreader after once installing it, and know of no argument against its use for veneer work.—**"Piano Manufacturer."**

Economy of Spreader Depends on Quantity of Work to be Done

Replying to your question on the subject of glue spreaders for piano manufacturers, we would say that it all depends upon the quantity of work they have to do. If they had any quantity of work, then a double roll glue spreader is certainly more economical than any other method If any piano manufacturer has used the glue spreader and thrown it out, something is wrong either with the spreader or with the operators.—**The Advance Machinery Company, Toledo, Ohio.**

Glue Supply Can Be Better Regulated With a Brush

In reply to the question referring to the use of the glue spreader, I can only give my experience in furniture work. I do not think a glue spreader is any good because the amount of glue cannot be regulated so well as by spreading with a brush. Also the refuse of the wood hangs on the rollers and is washed into the glue. Although the work is done quicker, I do not think the satisfaction is so great in the end.—**"Furniture Foreman."**

The Mechanical Spreader Gives Gratifying Results

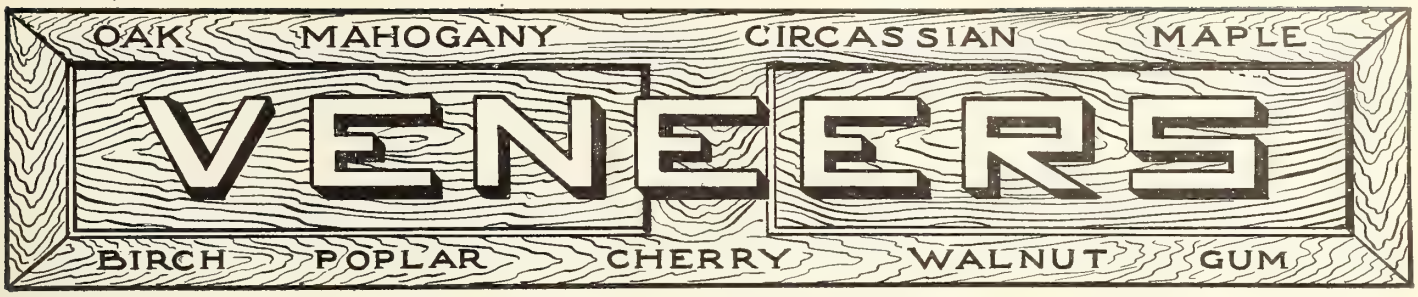
Many of the piano factories as well as furniture and other factories doing veneering and built-up work use glue spreaders, and we do not know of any piano factory discarding the use of a spreader. Of course, there have been cases where parties were using make-shift machinery and replaced such machines with special glue spreaders, and so far as we know every one of the many piano factories as well as the other factories using this machine are getting gratifying results from it.—**Chas. E. Francis Company, Rushville, Ind.**

Filing Band Saws for Hardwoods

THERE is as much difference in filing band saws for mixed hardwoods and for soft woods as there is between night and day. The output of a day's sawing of hardwood and of soft wood is so divergent as to quantity as to be scarcely believable to one without experience in that line. When a mill equipped with a band and re-saw has sawed for five or six years in soft wood and then is run on hardwoods for three or four years, and on about a dozen different kinds every day, it is possible to begin to judge the difference in the outputs of the two types of wood. A band saw filer will then fully realize how much more difficult his work is and will be confronted with the fact that the output of a day's cut is anywhere from twenty-five to thirty per cent. less in hardwood than in soft wood.

Comparing saw practice or fitting in soft wood with that of hardwood a radical difference will be found in the fitting, the shape of the teeth and the bench work, and the mill must be in perfect condition to get the best results. Suppose a mill saws hemlock or spruce; all the equipment is supposed to be in proper order, but yet the finer points are not as essential to get good results as when sawing hardwoods. Mills that cut hemlock and spruce are sawing material that is used mostly in the rough. If it is a little snaky or if some pieces are not just the standard thickness, they will go on the market just the same, but in hardwood it is a different proposition altogether. In that case stock is cut for furniture factories and all kinds of fine woodworking establishments, and in every case the demand calls for perfectly sawed lumber. A furniture factory can come nearer making a No. 1 out of a No. 2 common than it can to making a crooked board straight. It is not only that that decreases the cut of a hardwood mill. It is the getting the best out of logs that keeps hardwood lumbermen in business and when good sawyers make good grades, logs must be handled three or four tmes more than when sawing soft wood so it can easily be seen why the cut falls off so much changing from soft wood to hardwood. The question might be

(Continued on page 36)



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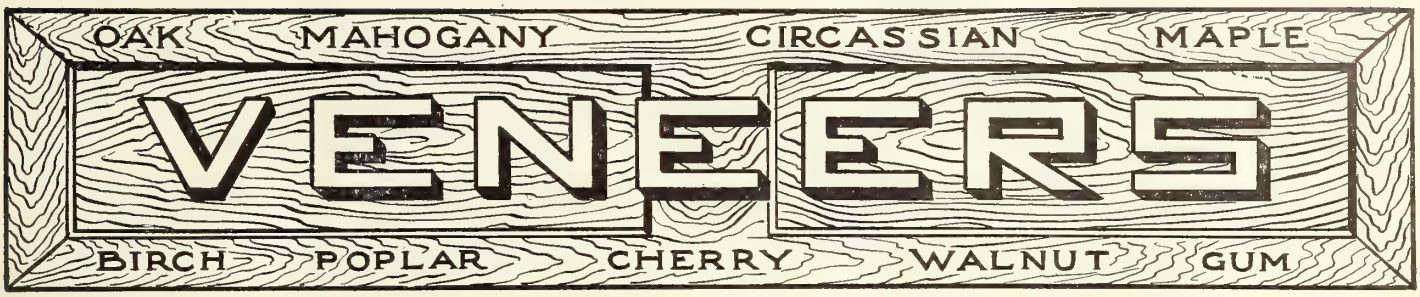

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Filing Band Saws for Hardwoods

(Continued from page 32)

asked "if the cut decreases so much why is the filing of the saws more difficult?" That is the result of handling many different kinds of wood. Most hardwood mills cut red and white oak, sugar and soft maple, chestnut, basswood. poplar, cucumber, buckeye, birch, beech, and ash with a small per cent. of wild cherry which makes thirteen—surely enough to make a filer sometimes think it is an unlucky number. The difficult thing is to so fit a saw that it will stand up to the requirements of so many grains and degrees of hardness and do equally good work in each. I believe that basswood should be sawed by itself because it is almost impossible to saw it mixed with sugar maple, ash or oak, owing to its fibrous nature which requires more swage on saws.

As I have said before in the fitting of saws for hardwood there are several essentials to first class work as follows: The right hook and pitch of teeth, the right throat room, the right tension, the right fitting of cutting points, the absolute accuracy of the back, the proper condition and speed of the mill, and more important, the proper swage. When a mill starts to saw hardwood it should be repaired thoroughly; all gearings and bearings should work snug. Especially is it necessary to have the band wheels ground more frequently than in soft wood as more or less dust gets on the wheels, the logs are more gritty, the wood is much harder, causing more strain on the saws and naturally the edges of the wheels wear much sooner. The carriage should be kept in first-class conidtion. Should it have a little play, seemingly not enough to hurt in soft wood, or should the set works have a little lost motion—even 1-32 of an inch—it will cause lots of trouble sawing high-grade hardwood. The carriage track requires more attention, the tremendous weight of sugar maple, ash or oak falling on the head blocks while handling the logs so much oftener with the nigger, causes it to get out of level and out of line so much more quickly. Another noticeable defect often found is that in cutting the last cut of a log the board dogs are not in good enough holding and working order to prevent the two or four-inch cant from springing. As a result there are often dozens of thick or thin boards in a day's cut.

The speed of the mill very frequently has much to do in making crooked lumber. Some millmen think if they speed a mill up like lightning it ought to go through the cut of a log like lightning. A mill with a speed of ten or eleven thousand feet per minute in soft wood does the work nicely, but to try that speed in hardwood without changing the spacing of the teeth in the saws means so many miscuts in a day and so many saws that the mill could not be run successfully. About eight or nine thousand feet is the best speed. With speed conditions satisfactory and a good sawyer the mill will do up-to-date work provided the saws are put up in good shape.

When fitting saws for hardwood it is very important to give the teeth more attention. A little less hook should be carried. If the filer is accustomed to extreme hook in soft wood it should be about one-fifth less in hardwood. By pitch I mean back of teeth—they should be lowered so as to have more clearance on back of teeth in sawing some hardwoods. Pitch is liable to gather on a high back tooth and cause it to snake. The depth of the tooth should be full 5/8 of an inch in frozen timber and about 1-16 more when the timber is not frozen. A nice round throat such as common sense dictates is very essential to assist in throwing the sawdust out easily.

The bench work on the saw requires the finest kind of work in hardwood or else "bull heads" and "snaky" lumber will result. It is necessary to look over the saws every day. Hardwood sawing requires more tension along the edges of the blade and it seems impossible to level them too much. All small lumps should be removed because the more level a saw is the smaller a swage can be run and the less chance of the saw getting hot. The back of the saw must be kept in such a condition that it fits the back gauge the whole length of saw without any variations whatever. Too much oscillating is not beneficial to saws in any kind of wood as it seems to throw them out of balance, especially as they enter the cut on large logs. A saw that oscillates also has a tendency to cause band wheel boxes to run warm. It is a good idea to run the back of the saw with a crown of about 1-64 or 1-32 of an inch in five feet. That makes the tooth edge the tightest. When the strain is on the saw in hardwood, very often the tooth edge gets warm, in which case the steel expands and if the saw is run without a crown or with a straight back it makes the tooth edge the longest and therefore not tight on the cutting edge. The result is the saw snakes very easily.

The most important question is the amount of swage a filer runs on his saws. If an estimate could be made of the amount of timber that is cut into sawdust by excessive swaging, it would be astonishing. However, I believe most filers are trying to do justice in that respect. In some cases millmen are constantly causing trouble and making bad lumber by forcing their filers to run saws with not sufficient swage; but filing saws in hardwood in clean logs on a seven and eight gauge swage on fourteen saws is entirely too much. Some filers swage a saw every three or four runs. Of course that saves work but not lumber. The best and most economical plan is to swage light and often—to make lumber—not sawdust. It requires a few more emery wheels and is a little harder on filing room machinery but the cost of that is small compared to the amount of lumber saved. In sawing gritty logs a nine gauge light is plenty of swage. If the logs are clean nine gauge tight is sufficient. If all these things are adhered to a sawmill is sawing hardwood at its highest efficiency.—Hardwood Record.

Spruce formed by far the largest cut of one kind of timber on the public lands of New Brunswick last year. Pine, which came next, produced less than one-third as much as spruce, as will be seen by the following table:—

Spruce logs	173,106,846 ft.
Pine logs	58,492,475 ft.
Hardwoods, including birch, beech, maple and oak	11,194,185 ft.
Fir logs	21,725,578 ft.
Hemlock logs	3,302,296 ft.
Cedar logs	2,399,765 ft.
	270,221,145 ft.

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See Page 24.

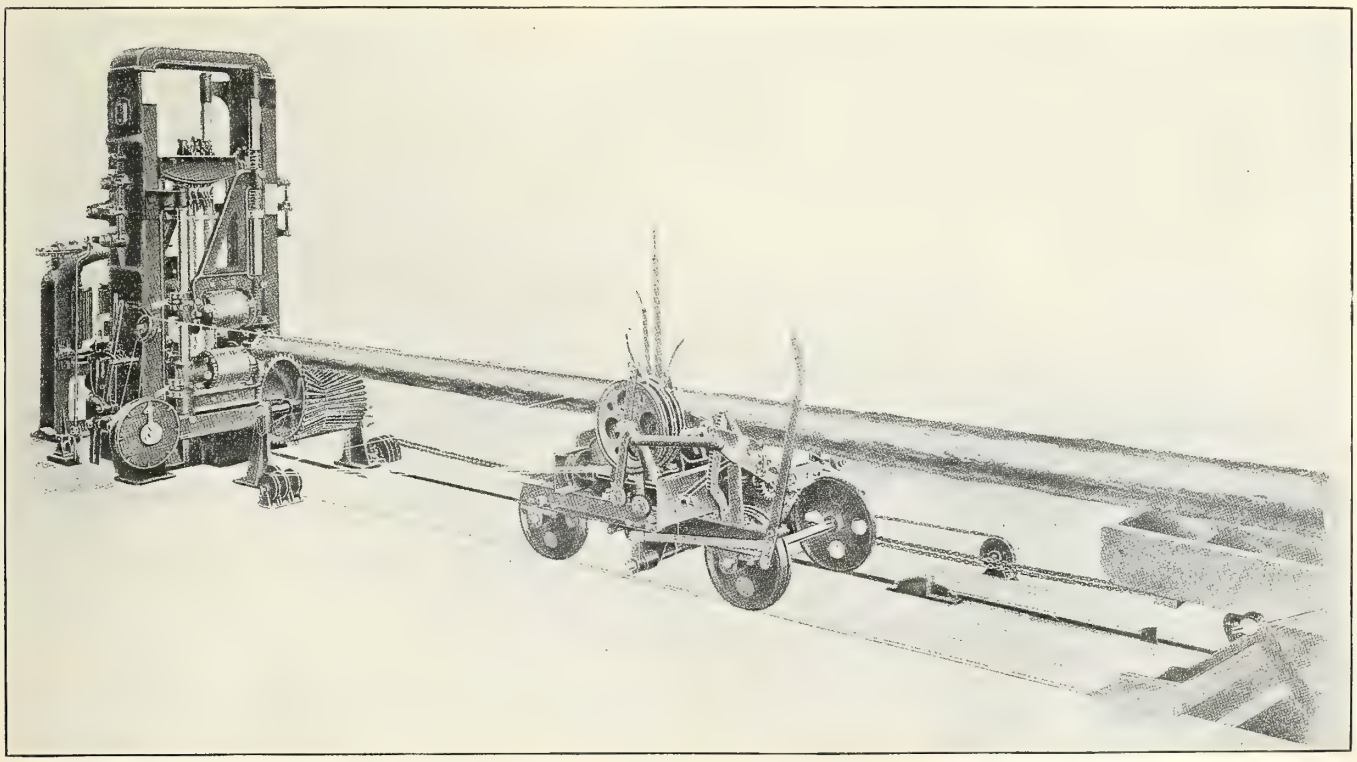
Swedish Machinery on the Canadian Market

SWEDISH machinery has an excellent reputation, and an examination of a very fine catalogue, excellently illustrated, issued by the J. and C. G. Bolinders Company, Limited, Stockholm, shows that Sweden is able to produce a complete range of woodworking appliances. This firm's machinery has obtained 140 prize medals, including five grand prizes, in addition to 106 diplomas of honour. The company intend to make a vigorous effort to secure business in Canada, and with the long line of machines should be able to obtain a satisfactory turnover. Many of the machines have appliances new to this country. The illustrations in the catalogue, reproduced from photographs, show the machines to be well manufactured and finished. The appliances include standard log and saw frames, new ideal frame, precision log frame, rip saws, improved edger, fast feed flooring and match-boarding machines, planers, moulders, outside moulders, surfacers, shavings cutters, double resaws, resaws, band resaws, lath and rip saws, crosscut saws, grinding machines, automatic boxboard machines, patent special cutters, also tools and accessories. Many of the machines are made in several sizes and for special purposes. The catalogue gives details of these machines, and is complete in every particular.

One of the features is the patented precision log frame, which is the result of many experiements. It is designed not only for the Swedish timber—small grown soft timber—but also for the ordinary run of timber found in various countries. Thin saw blades are used for all log diameters, the saw kerf being about 1/16 in. The carriage is brought by mechanical power to the log haul, and the latter automatically loads the log on to the carriage. Afterwards all manoeuvering is accomplished by means of levers, which control the movements of the log in any direction. The upper pressure rolls adapt themselves automatically to the varying diameter of the log whereby the hand adjustment of the ordinary log-frame rolls is obviated. The rolls control the most irregular log with ease and guide it with precision through the machine. As soon as the sawn log has passed through the frame, vertical and horizontal rolls are automatically set in rotation and transport the lumber to a conveyor. The makers state that the accuracy obtained with the maximum feed and a saw kerf loss of only 1/16 in. is due to the fact that all excessive pressure on the saw blades is avoided by letting each tooth take its proper share of the work. This can only be realized by making the overhang of the saw blade frame and the feed rate change automatically, according to the diameter of the log at every movement. As the diameter of the log being sawn changes, either increasing or decreasing, the motion of the feed rolls changes correspondingly.

By means of an eccentric and lever system entirely automatic in its action, both the saw blade frame guides and the friction disk of the feed rolls are governed by a form or curve which is constructed from a diagram giving the correct ratio of overhang and feed rate to any diameter. For sawing crooked logs there is a device which makes it possible for the log to be guided through the machine in a line corresponding to its crookedness by setting the feed rolls out of parallelism with each other. This is accomplished by a hand lever in the changing carriage; at the same time, a graduated scale gives the amount of variation made. The log-frame is entirely self-adjusting. The machinery is built from only the highest grade Swedish material, guaranteeing stability and correctness as well as long wear. The Canadian agents of the J. and C. G. Bolinders Company, Limited, are the Swedish Steel and Importing Company, Limited, 503 Canadian Express Building, Montreal.

A new lumber company has been organized at Edmonton, Alta., under the name of the Excelsior Lumber Company. They are opening yards on the E. D. and B. C. Railway at Swan River, High Prairie, McLennan and Peace River Crossing. The head office of the company is in Edmonton, A. T. Cushing, of the Cushing Bros., Ltd., being manager. J. Johnson, until recently manager of the lumber business of the Peace River Trading Company, at Grouard, is yards manager. Several cars of lumber have already been shipped to the different points.

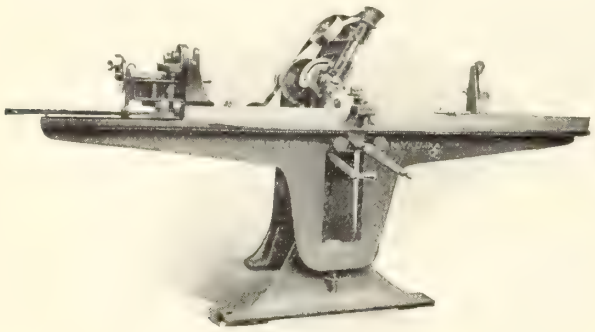


Patented precision log frame made by J. & C. G. Bolinders Company, Limited, Stockholm, Sweden.

The Production of Spiral Turnings

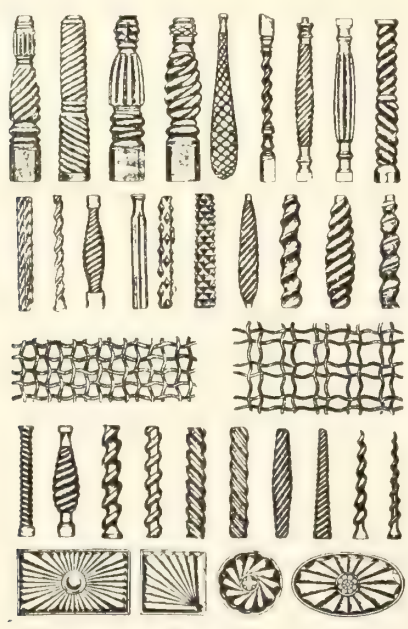
IT has long been the aim of many designers to produce a practical machine for making all kinds of spiral patterns in wood. Such patterns find great popularity in many fields on account of the beauty they possess when well worked.

The chief difficulty has been to make cutters that will work both with and against the grain and leave a smooth finish. This problem has received particular attention for a long time from the P. Pryibil Machine Company, Inc., of New York, who have been making patent fluting and twist



The Pryibil Twist Machine.

machines for the furniture trade for the last fifty years, and who have now been successful in producing a machine that will cut all kinds of closed and open, single, double and three strand, right and left, pineapple cuts, etc. Knowing the great capacity of the fly cutter and its ability to hold an edge, this firm set out to make it cut smoothly as well. They have not only done this, but they have simplified it. The knives employed are four in number, two right and two left. They are exactly the same as the bits used on variety shapers, or edge moulders, and are held between collars in the usual manner, except that instead of standing square with the collars they are inclined sideways at an angle of 45 degrees. This causes them to act with a shearing cut, commencing at the outside of the work and proceeding towards the centre. In many cases the resulting work is so smooth that it is difficult to tell which side of the bead was cut against the grain. The knives are easily and cheaply made from bar steel, and as two are right and two left they can be placed face to face when grinding, so that both right and left hand cutters will be exactly the same shape. The one set of four cutters will cut both right and left hand twists without readjustment and without changing the belt on the cutter spindle.



Patterns of Spiral and Fluting Work.

When curved outlines have to be worked a form must be used. This form is cut to the exact outline of the finished pattern and is of a width equal to half the finished diameter. Thumb-screws are provided on the machine by which this form may be fixed, so that the roll under the cutters runs along the edge of the form and varies the distance between the cutters and the work.

This machine finds a particular application in the case of interwoven screen work known as the "Moorish" pattern, which consists of long thin spirals of wood interwoven like wire netting. As the spirals for this work are usually long and light, it has always been difficult to support the sticks against the cut. In the Pryibil machine a steady rest is provided directly opposite the cutter. This rest holds a wood block through which a hole is bored fitting the stick to be twisted. The cutter works its own way through the block to the work, and as the cutter and block maintain their relative positions while the work feeds along there can be no springing or breaking. Adjustments are provided by which it is possible to obtain twenty different degrees of twist—varying from one turn in 1½ inches of length to one turn in 10½ inches. These are made by changing two wheels on a single screw according to an indicating table attached to the machine. The recent revival of the Jacobean style of furniture, which includes spiral ornament, has made the use of this machine indispensable in the furniture trade.

G. P. Seibert, for some time head of the Sales Department of the Georgian Bay Shook Mills, Limited, of Midland, Ont., has been appointed Sales Manager for the Schultz Bros. Company, Limited, of Brantford, Ont., manufacturers of sash, doors and mill work. Mr. Seibert is well known in the Canadian constructional field, he having been Secretary of the Ontario Sash & Door Association.

From J. E. Dougherty, General Manager of the British-American Mills & Timber Company, Limited, Vancouver, B.C., we have received further information regarding the fire at the Superior Sash and Door factory, controlled by them, at New Westminster, B.C. The approximate loss was $50,000, partially covered by insurance. The question of rebuilding the plant will be governed entirely by future developments.

The firm of Penrod-Jurden & McCowen, Inc., have announced the opening of general offices in Memphis, Tenn. They succeed the Penrod-Jurden-McCowen Lumber Company, Limited, of Kansas City, Mo., and will take over the entire operations of that company (including the band mills, stumpage, etc.), at Brasfield, Ark. This firm also succeed the Penrod Walnut & Veneer Company, of Helena, Ark., where they will operate the veneer and saw mills belonging to the company. The business at Memphis will be under the personal direction of Mr. R. L. Jurden, of Kansas City, Mo., and Mr. H. A. McCowen, of Louisville, Ky., who will locate permanently in Memphis. This company's output, both of lumber and veneers, is well known for its high quality, and the object of this consolidation is to facilitate the handling of the southern operations and to create a more efficient organization for the production and distribution of their products. All correspondence should now be addressed to Memphis, Tenn. The Kansas City plant of the Penrod Walnut & Veneer Company will continue exclusively under the personal direction of Mr. J. N. Penrod.

We are prepared to quote close prices on

Plain Quarter-cut Oak, Mahogany, Birch, Etc.

both from Toronto stock and for quick delivery from the mills in the different thicknesses and sizes. Our Oak includes both American and English manufacture.

We have a small assortment of ALDERLITE in 3/16″ and 1/4″ in large sheets which we can ship immediately.

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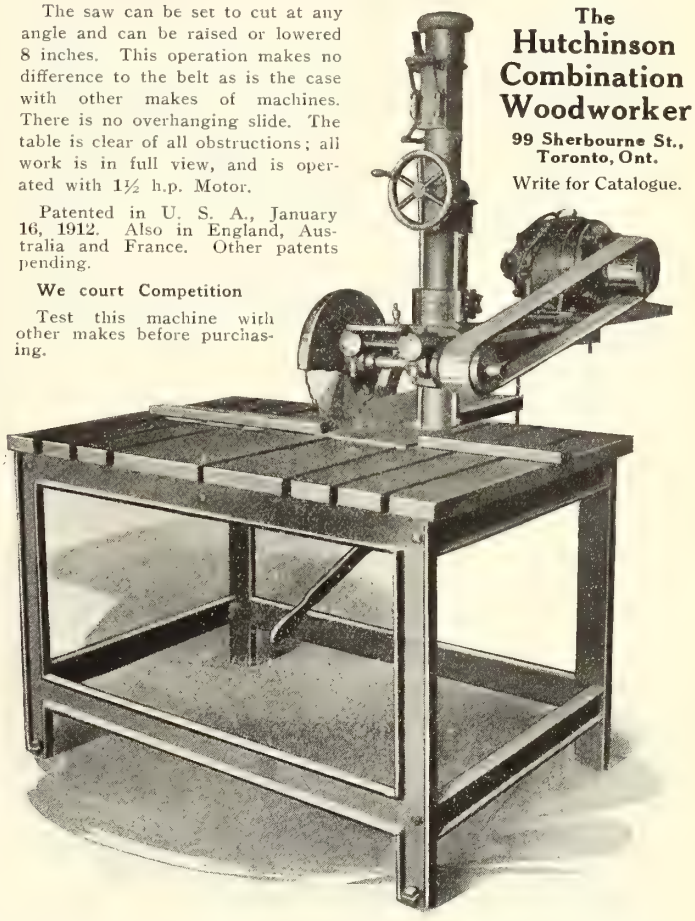
The saw can be set to cut at any angle and can be raised or lowered 8 inches. This operation makes no difference to the belt as is the case with other makes of machines. There is no overhanging slide. The table is clear of all obstructions; all work is in full view, and is operated with 1½ h.p. Motor.

Patented in U. S. A., January 16, 1912. Also in England, Australia and France. Other patents pending.

We court Competition

Test this machine with other makes before purchasing.

The Hutchinson Combination Woodworker
99 Sherbourne St., Toronto, Ont.
Write for Catalogue.



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Good Stocks, Prompt Shipments, Satisfaction

C. A. SPENCER
Wholesale Dealer in Rough and Dressed Lumber
Eastern Townships Bank Building
MONTREAL - - Quebec

News of the Trade

The Scotstown Saw Mill Company, carrying on business at Scotstown, Que., has been dissolved.

The sash and door factory of Walter Bowen, Beebe Junction, Que., has been destroyed by fire.

The Imperial Rattan Company, Stratford, Ont., are making enlargements at their chair plant.

H. L. Halter is reported to be interested in the establishment of a furniture factory at Welland, Ont.

At Minto, Man., A. H. Raymer has sold his lumber business to the firm of Home Lumber Yards, Limited.

Arrangements have been made for rebuilding the plant of Gingras & David, manufacturers of sash and doors, at Bordeaux, Que.

The M. & E. Lumber Company, of Calgary, Alta., have purchased the lumber business of W. R. McGowan & Company, at Killam, Alta.

At New Westminster, B.C., the construction of a shingle mill for the Mackie Mill and Mercantile Company, of Gettysburg, Wash., has been commenced.

With a capital of $40,000, the Beach Cheese Box Company, Limited, Morrisburg, Ont., has been formed to manufacture cheese boxes, apple barrels, etc.

At Hanover, Ont., the Ball Furniture Company has been incorporated with a capital stock of $125,000, to manufacture furniture, woodenware and other articles.

The buildings and machinery of the saw and planing mills of Smith and Rhulard's shipyard, Lunenburg, N.S., were badly damaged by fire and water last month. There was no insurance.

Additions will be made to the plant of the Port Dover planing mills, Port Dover, Ont. An extension of 20 ft. x 42 ft. will be made to the factory, and a new dry kiln (40,000 ft. capacity) will be built.

At Stratford, Ont., the McLagan Furniture Company have been working on an order from the Dominion Government for packing cases for the shells to be manufactured elsewhere in that city.

Plans are in progress for the erection of a furniture factory at Welland, Ont., by W. P. Ball. The new building is to be one and a half storeys high, 25 ft. x 50 ft. in dimensions, of frame construction.

McLean, Strudwick & Delyea will use water power in their new planing mill at Bancroft, B.C. They have secured a site adjoining the electric light plant, and work has been commenced on the foundations of the mill.

The Alliance Lumber Company, Limited, has been incorporated at Hamilton with a capital of $40,000. The provisional directors are R. J. Press, Matthew Cole and Daniel Cole, all of Hamilton.

Mr. J. J. Dupuis, late candidate for the mayoralty of Verdun, P.Q., was recently entertained at a banquet by some of the citizens. Mr. Dupuis is a member of the sash and door firm of J. P. Dupuis, Limited, Verdun, Que.

John Currell, known as the pioneer saw-filer of Vancouver and district, who had been a resident of the city for over twenty-five years, died at his residence, 638 Eleventh Avenue East, on January 26th, in his 76th year.

The Sepoy Manufacturing Company, Limited, Lucknow, Ont., has been incorporated with a capital of $20,000 to carry on business as manufacturers of trucks, sleighs, wheelbarrows, ladders and other lines. The provisional directors of the company include Frank Tait, W. G. Andrew, G. H. Smith, and J. Agnew, all of Lucknow.

R. D. Kilgour, vice-president of the Imperial Rattan Company, Stratford, has purchased what hitherto has been part of the output of that concern, the "Simplicitus" davenport. He is moving the concern to Toronto.

S. Anglin & Company, Kingston, Ont., intend to rebuild their saw and planing mill as soon as their insurance has been adjusted. The damage, which was partly covered by insurance, amounted to about $15,000.

Mayor Perry D. Roe, of Port Moody, B.C., has been the recipient of numerous congratulations from fellow lumbermen on his election by acclamation for a third term as chief magistrate of the busy little city at the foot of Burrard Inlet.

The F. E. Coombe Furniture Company, Limited, have been incorporated with capital stock of $100,000. They will operate the general furniture manufacturing business that has been known as the F. E. Coombe Furniture Company, at Kincardine, Ont.

At Montreal, Que., the Canadian Toy and Novelty Company has been incorporated to manufacture and deal in toys, office furniture, etc. The capital stock is $75,000, and the company will acquire a similar business owned by S. Meunier & Fils.

Mr. E. T. Nesbitt, whose woodworking plant at Quebec was described in detail in our last issue, is taking a few weeks' holiday in Bermuda. The trip is undertaken in the nature of a rest-cure, Mr. Nesbitt not having been enjoying the best of health for some little time. We shall hope to hear that he has passed the convalescent stage before this issue goes into print.

There were 21,000 more logs cut in Newfoundland in 1913 than in the previous year, the total number being 1,504,000, from which it is estimated 46,000,000 feet of lumber (principally spruce) were produced, an increase of about 5,000,000 feet over 1912. The lumber turned out was valued at $600,000 and consisted of 24,500,000 feet of boards, 7,225,000 feet of scantling, 1,241,000 feet of heading, 673,000 feet of box material, 106,000 palings, 6,700,000 spruce laths, and 9,100,000 spruce shingles. In addition to the lumber, 135,000 cords of pulp wood were cut, an increase of 11,000 cords over 1912. The men employed in the forests and sawmills numbered 3,500. There were 15 lumber mills working under license, in addition to 328 small mills worked by the fishermen in conjunction with the fishery. For the fiscal year 1912-13 there were shipped 413,000 feet of lumber valued at $6,306, as against 504,000 feet, valued at $8,215, in 1912. Canada took 272,000 feet and St. Pierre 141,000 feet. The total number of laths exported was 1,365,000.

A mill handling a dry kiln for stock on special orders, must pay special attention to systematizing this work. Every order should be planned ahead in ample time to get it dried ready to be taken and worked up on schedule. By means of a little forethought, and keeping track of such stuff as is in process of drying, and also much as is taken from stock piles ready for the kiln, it is possible to avoid much unnecessary delay in this direction.

In piling gum lumber it is recommended that eight cross-sticks be used on a pile 16-ft. in length. This is quite a departure from the old three-stick piling method, and it is a good idea, too, for even in piling other lumber than gum is helps keep the stock straight and flat.

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Perfect Dry Kiln Trucks
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Double and Single

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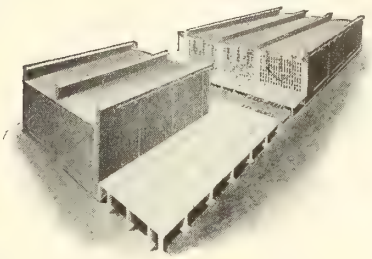
MORTON HUMIDITY SYSTEM POCKET KILNS



This is the ideal type of kiln for any firm that has numerous kinds and thicknesses of lumber to dry.

Perfect Control and **Rapid Results** build a kiln that fits your special requirements.

Write for our 3 Complete Catalogs and Special Folder-60 F.

MORTON DRY KILN CO., 351-357 W. 59th St., CHICAGO, ILL.

Every kind and form of

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QUALITY DRYING

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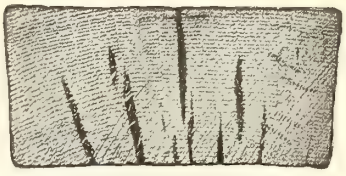

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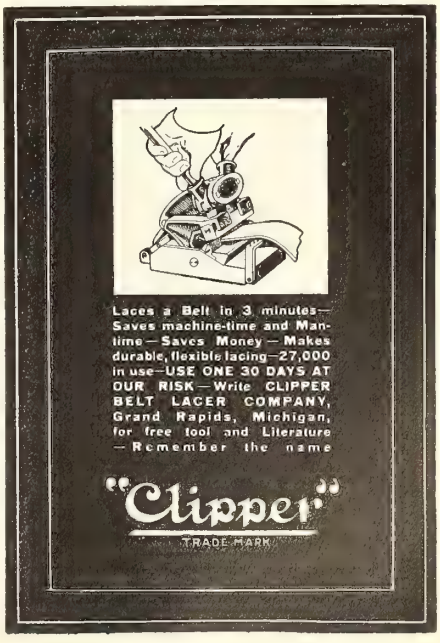
You may have 30 days' **Free Trial** for the asking. You may try it in your own plant, under your own conditions, without obligation on your part. If it does not demonstrate its efficiency the trial will cost you nothing. If it **does** prove to be what is claimed for it, "The **quickest,** most **effective,** most **economical** Belt Lacer in the World," you may remit for the tool, and thereby add one more to the 27,000 "Clippers" already in use, all over the world, by all kinds of manufacturers.

Our guarantee insures Perpetual Satisfaction with your tool. We fully guarantee the "Clipper" Lacer, and at any time will replace, free of all charge, any parts worn or broken; or we will repair, free of charge, any lacer sent us prepaid, returning it by express or freight, prepaid.

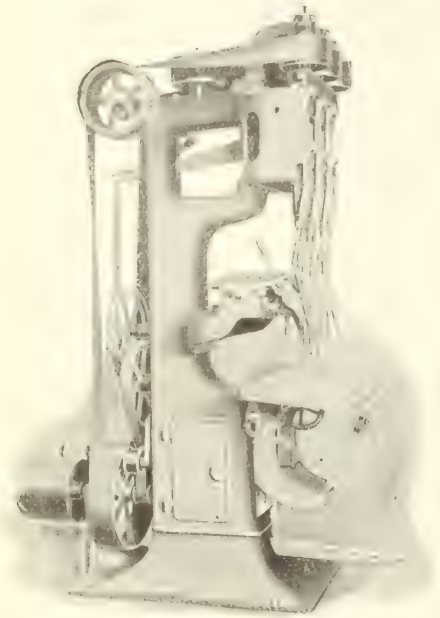
Clipper No. 2, 6 inch, laces any width or thickness. Laces a belt in three minutes. Saves man-time, machine-time and money. Makes a durable, flexible lacing. The one Belt Lacer which makes it unnecessary to remove the belt. The CLIPPER goes to the belt. The Clipper goes to you for a FREE TRIAL merely for the asking.



The Clipper Belt Lacer Company

1010 Front Ave., Grand Rapids, Michigan

CHEAPER and BETTER BORING

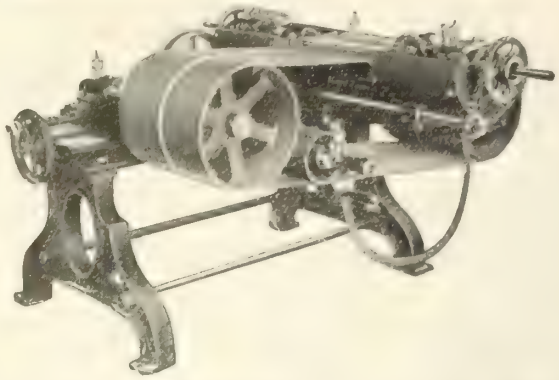


can be done by the use of my Multiple Spindle Boring Machines.

Twelve holes or less are bored at once, in a straight line, parallel lines, staggered, zig-zag, in a circle or almost any position, one inch center to center or 24 ins. apart, any angle up to 35 degrees.

Ask for details.

J. M. NASH, Milwaukee, Wis.



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Ober Double Belt Automatic Sander

Simple, Durable, Great Capacity

We also make **Lathes, Rip-saws, Cut-off Saws, Bolting Saws, Chucking Machines, Etc.**

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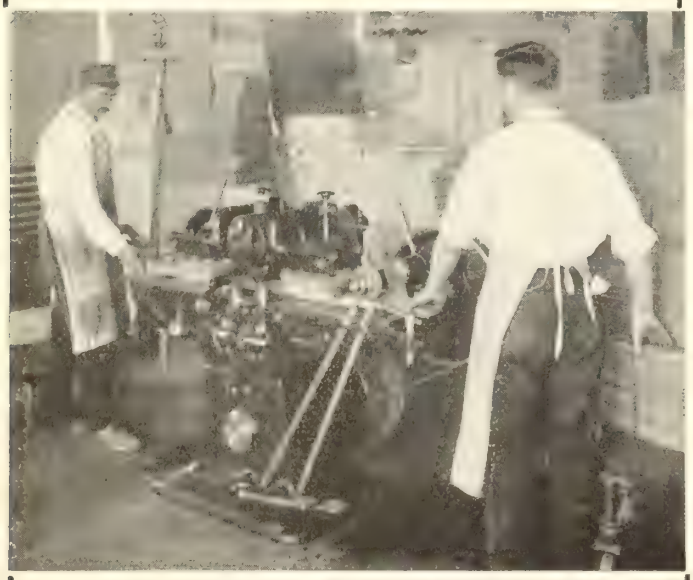
THE OBER MFG. COMPANY

CHAGRIN FALLS, O., U.S.A.

Duplex Moulding Sander



The Duplex Moulding Sander operating on office furniture. This machine will sand short as well as long mouldings from the smallest up to eight inches in width. The only machine for sanding fine line mouldings and trim.

Manufactured by

Duplex Moulding Sander Co.

Hornell, N. Y., U. S. A.

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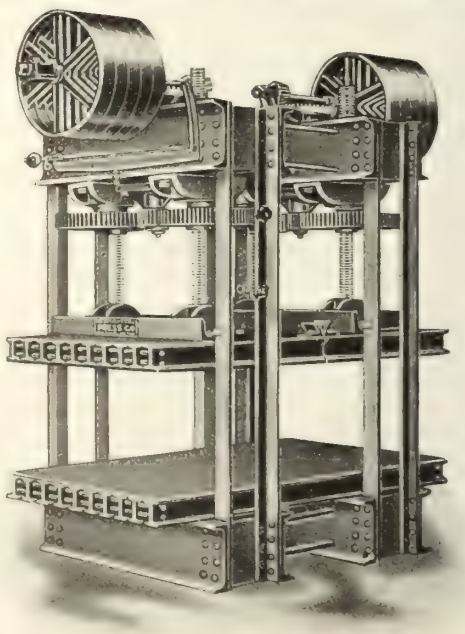

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Successor to Cincinnati Branch of The Prendergast Co.
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Our Gum comes from Arkansas—the Finest in the World—Nice Band Sawn Stock.
At our Tennessee mill we are producing some choice Band Sawn
Plain and Quartered Red and White Oak, Poplar
Prompt Shipments and High Grades our Hobby. **Mahogany** Let us quote you on your requirements.

The "Canadian Woodworker" Buyers' Directory

For Alphabetical Index see page 4

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The Carborundum Co., Niagara Falls, N.Y.

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Company, Woodstock, Ont.

BABBITT METALS
Fay & Egan Co., J. A., Cincinnati, Ohio.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

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Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Pryibil Machine Company, P., New York.

BAND SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Petrie, H. W., Toronto.
Pryibil Machine Co., P., New York City.

BAND SAW MACHINES
Berlin Machine Works, Hamilton, Ont.
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Petrie, H. W., Toronto.
Williams Machinery Co., A. R., Toronto, Ont.

BAND SAW STRETCHERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

BELT LACER
Clipper Belt Lacer Co., Grand Rapids, Mich.

BENCHES
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

BENDING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

BLOW PIPING
Invincible Blow Pipe Company, Toronto.
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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Pryibil Machine Co., P., New York.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass.

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Meakins & Sons, Hamilton.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Co., P., New York City.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Curtis Machinery Corporation, Jamestown, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.

CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
Palmer & Sons, A. E., Owosso, Mich.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Curtis Machine Corporation, Jamestown, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.

COMBINATION WOODWORKER
Hutchison Woodworker Co., Toronto, Ont.

CUT-OFF SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Ober Mfg. Co., Chagrin Falls, Ohio.
Pryibil Machine Co., New York.
Simonds Canada Saw Co., Montreal, Que.

CUTTER HEADS
Berlin Machine Works, Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

DADO HEADS
Elliott, W. A., Toronto.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

DOVETAILING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

DOWEL MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.

DRY KILNS
Andrew Co., A. H., Chicago, Ill.
Grand Rapids Veneer Works, Grand Rapids, Mich.
Morton Dry Kiln Co., Chicago, Ill.
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

DUST COLLECTORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

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Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

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FILES
Simonds Canada Saw Co., Montreal, Que.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Whitney & Son, Baxter D., Winchendon, Mass.

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Marietta Paint & Color Co., Marietta, Ohio.
Schmidt Co., Walter K., Grand Rapids, Mich.

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Pryibil Machine Company, P., New York.

FLUTING AND TWIST MACHINE
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Palmer & Sons, E., Owosso, Mich.

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GLUE JOINTERS
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GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Petrie, H. W., Toronto.

GRINDERS (Tool)
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Pryibil Machine Company, P., New York.

GRINDING WHEELS
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Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
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Atlantic Lumber Company, Toronto.
Duhlmeier Bros., Cincinnati, Ohio.
Imperial Lumber Company, Columbus, Ohio.
Kosse, Shoe & Schleyer, Cincinnati, Ohio.
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Mowbray & Robinson, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Powell Myers Lumber Co., South Bend, Ind.
Prendergast Company, Cincinnati, Ohio.
Shiels & Company, Chas. F., Cincinnati, Ohio.
Spencer, C. A., Montreal, Que.
Wilcox & Knapp, Conneautville, Pa.

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Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.

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Galt Knife Company, Galt, Ont.
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Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

LATHES
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Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

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Simonds Canada Saw Co., Montreal, P.Q.

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Black Bros. Machinery Co., Mendota, Ill.

MITRE SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
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Simonds Canada Saw Co., Montreal, P.Q.

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Lightfoot, Stanley, Toronto, Ont.

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Whitney & Son, Baxter D., Winchendon, Mass.

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Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

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Petrie, H. W., Toronto, Ont.
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Shimer & Sons, Samuel J., Galt, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

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Perrin & Co., Wm. R., Toronto, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

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Petrie, H. W., Toronto, Ont.
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Williams Machinery Co., A. R., Toronto, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

RUBBING MACHINES
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SANDERS
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Black Bros. Machinery Co., Mendota, Ill.
Curtis Machine Corporation, Jamestown, N.Y.
Duplex Moulding Sander Co., Hornell, N.Y.
Elliot Woodworker Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

SANDPAPER
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Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Shimer & Sons, Samuel J., Galt, Ont.

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Simonds Canada Saw Co., Montreal, P.Q.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SAW GUARDS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Pryibil Machine Company, P., New York.

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The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
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Simonds Canada Saw Co., Montreal, Que.

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Pryibil Machine Company, P., New York.

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Whitney & Sons, Baxter D., Winchendon, Mass.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.
Simonds Canada Saw Co., Montreal, P.Q.

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Williams Machinery Co., A. R., Toronto, Ont.

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Petrie, H. W., Toronto, Ont.
Pyribil Machine Co., P., New York.
Shimer & Sons, Samuel J., Galt, Ont.
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Whitney & Sons, Baxter D., Winchendon, Mass.

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Ober Mfg. Company, Chagrin Falls, Ohio.

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Whitney & Sons, Baxter D., Winchendon, Mass.

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Whitney & Sons, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
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Ober Mfg. Co., Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

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Sheldons Limited, Galt, Ont.

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Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Whitney & Sons, Baxter D., Winchendon, Mass.

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Fay & Egan C., J. A., Cincinnati, Ohio.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

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Marietta Paint & Color Co., Marietta, Ohio.

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Cincinnati Veneer Company, Cincinnati, Ohio.
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Dupre & Company, C., Toronto, Ont.
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Hoffman Bros. Company, Fort Wayne, Ind.
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Penrod Walnut & Veneer Co., Kansas City, Mo.
Strong Veneer Company, Jamestown, N.Y.
Waetjen & Co., Geo. L., Milwaukee, Wis.
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Canadian Boomer-Boschart Co., Montreal, Que.
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Chapter 2—Manufacture of Glue
Chapter 3—Testing and Grading
Chapter 4—Methods in the Glue Room
Chapter 5—Glue Room Equipment
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Woodworker Publishing Co.
Limited
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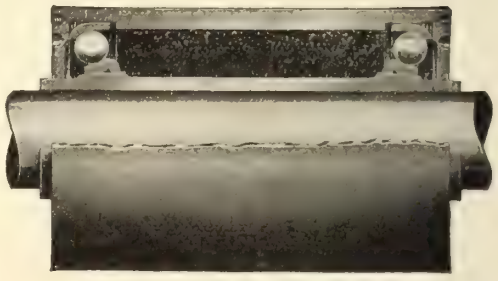

Your Loose Pulley Trouble Disappears

when installed with

CHAPMAN BALL BEARING LOOSE PULLEYS

A little vaseline **once a year** is all the **attention** and **lubrication** required.

Our loose Pulleys cannot run hot and do not cut the shaft.

Write us for particulars and price list.

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Chapman Double Ball Bearing Co.
of Canada, Limited
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A Practical Work on

The Art of Making Patterns, written by a pattern-maker with thirty years' experience. Contains information on Pattern Making and Pattern-Makers in general, also a detailed description of the necessary materials and how to use them. Then the tools, both hand tools and machine tools, with special chapters on the Lathes, the Band Saw and the Circular Saw, with many examples of work which may be done on these machines.

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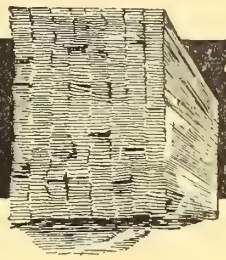

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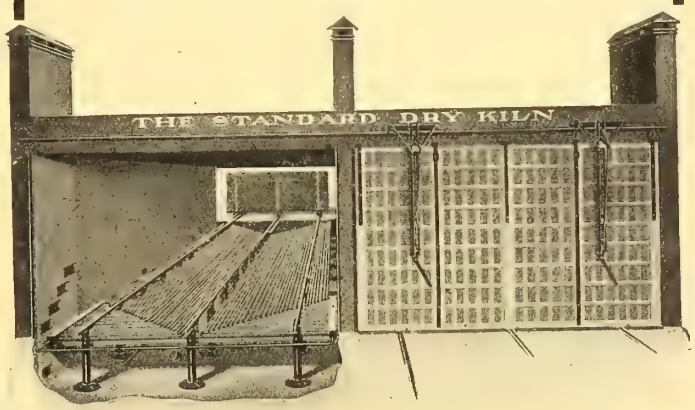
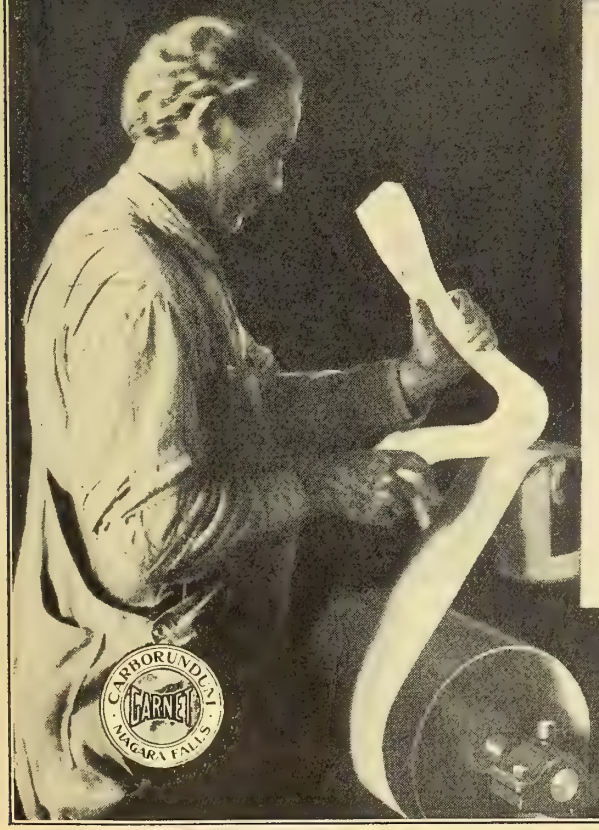
This is **proved** by the testimony of many furniture and hardwood manufacturers who use The Standard Kiln. Their letters are in our 64-page List of Users. This and our catalog will be mailed on request. Address: The Standard Dry Kiln Co., 1560 McCarty St., Indianapolis, Ind.



THERE IS A DIFFERENCE



IF someone tries to tell you that Garnet Paper is just Garnet paper—that there is no difference—just remember that there is garnet paper and

Carborundum Brand Garnet Paper

The difference is there because Carborundum Brand is uniform—it is coated with the cleanest, sharpest of Garnet grain—the glue is of the highest grade—the process of manufacture the best.—Carborundum Brand Garnet Paper cuts faster—gives a better finish—lasts longer.

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Cincinnati Cleveland Grand Rapids
London, Eng.

The source of many a beautiful interior is

MARIETTA SPARTAN ART WOOD STAINS

This is especially true where both the furniture and woodwork are finished with Marietta goods.

These stains are in ever growing demand with furniture and piano manufacturers, interior finishers and manual training schools.

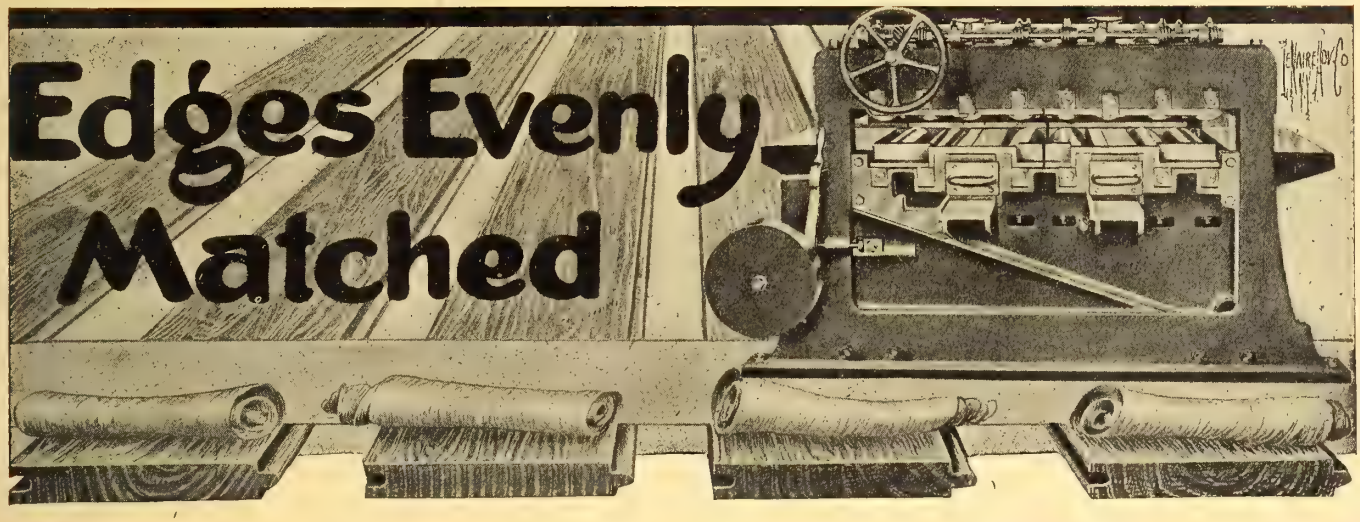
Wherever a classy finish is desired, they are indispensable.

The Marietta Paint and Color Co.

Marietta - Ohio

Volume Fifteen TORONTO, APRIL, 1915 Number Four

CANADIAN WOODWORKER and Furniture Manufacturer



Flooring that is passed through

A Whitney Tandem Wood Scraping Machine

comes out with a lustrous finish, with no broken edges or torn-up spots, and with no grit embedded in its surface.

And when the flooring is laid, it must match perfectly, for each strip has the same thickness of shaving taken from it.

This uniform and high quality finish counts in marketing your product and the fact that it can be attained with a Whitney Scraper at a far lower cost for upkeep and operation than any other machine or method would give, means much to your profit.

The smallest Whitney Tandem Scraper, with 15-in. Table, admits narrow stuff in multiples of three—its speed of feed is 100 feet a minute, which gives you an output of 200 feet a minute, if you can handle it, done with a mirror finish.

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Alphabetical Index to Advertisers, Page 6

"Leather like gold has no substitute."

"CROWN" Planer Belting

For Heavy Service and Small Pulleys

Running machines with slipping belts is like trying to cover ground on a tread-mill—a case of wasted energy.

Crown Planer Belting is specially constructed and finished to grip the pulleys. This belting is ideal for use on planers, matchers, etc., where it must take short turns over small pulleys.

The leather used in "Crown" Planer Belting, which we tan ourselves, is carefully selected and no weak spots are used.

The small pulley is the acid test of the construction, pliability and gripping qualities of a leather belt. "Crown" Planer makes good under such a test.

Write us for prices.

Established since 1876.

Made in Canada

Sadler & Haworth

Tanners and Manufacturers

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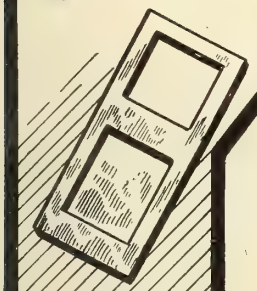
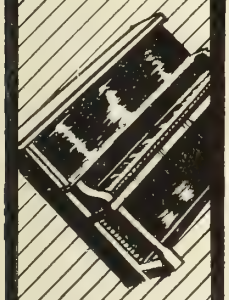
Glue Room Economy





The Strict Maintenance of Quality is Your Guarantee of Security

The quality of Perkins Vegetable Glue is established and maintained everywhere glue is used in the woodworking industry. It makes no difference whether you use it in Wisconsin or Alabama, the quality never varies.

Perkins Quality is the Standard

Because we originated vegetable glue ; hold patents in United States and Europe; have no business except to manufacture and sell our product and expect to have no other and so must necessarily maintain the standard.

You Take No Chance

When you use Perkins Glue, because every pound of material that enters into the make-up is carefully inspected and the finished product is ***absolutely uniform in quality.***

Satisfaction Guaranteed

Covering a number of years, all classes of stock, and the total number of factories where we have installed our glue, the high per cent. of the business we now hold proves that our glue and methods satisfy our customers. ***We guarantee satisfaction.***

Quality and Efficiency

If you and your workmen know that the glue in use is uniform in quality and can be relied upon to do the work for which it is intended, it naturally follows that ***you will get more and better work.***

May We Demonstrate?

Why don't you have a Perkins demonstration? We will demonstrate to your satisfaction—in your own factory—that Perkins Vegetable Glue will ***give the best results and cut your glue room costs.***

Perkins Glue Company

Originator and Patentee of Vegetable Glue

Suite 809-810 J.M.S. Bldg. - South Bend, Indiana

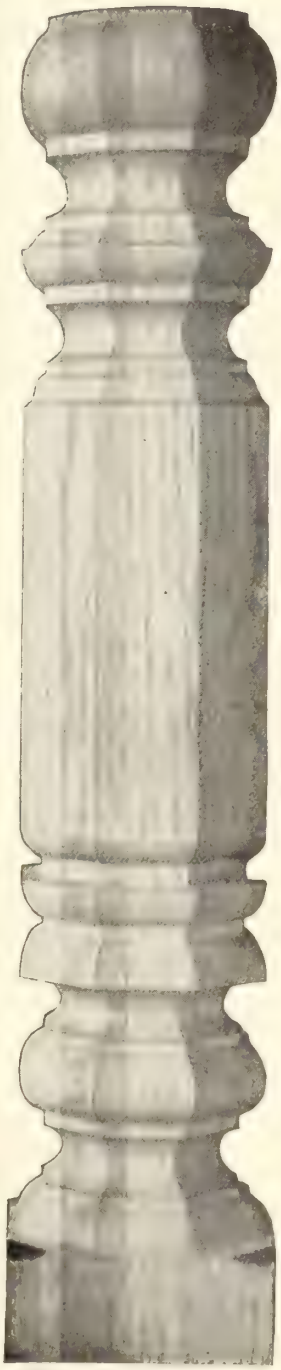
Perkins Glue

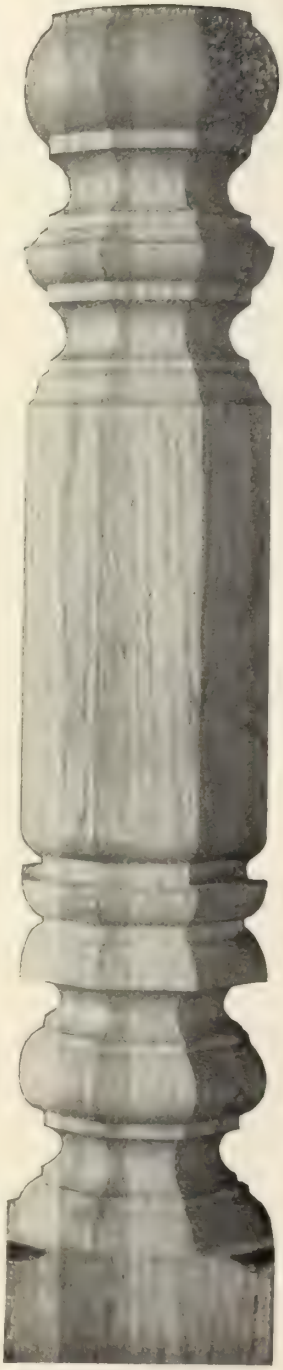
The Better Selling Styles of Furniture Call for Square, Hexagon, Octagon and Like Designs

TRUE! You are Making Many of the New Designs

— BUT —

Are You Making Them by the Twenty-Times-Better Way?





It's tedious, expensive work to make the much-called-for square, hexagon and octagon designs, or even plain round turnings, by the old methods.

There's a better way than band saw, shaper, or hand turning methods—the "Twenty-Times-Better Way."

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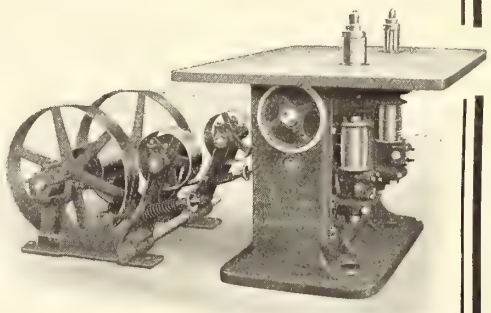

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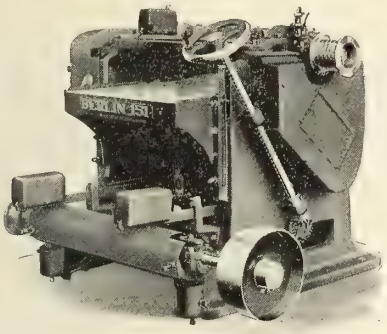

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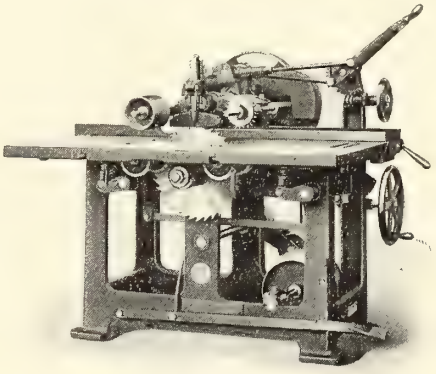

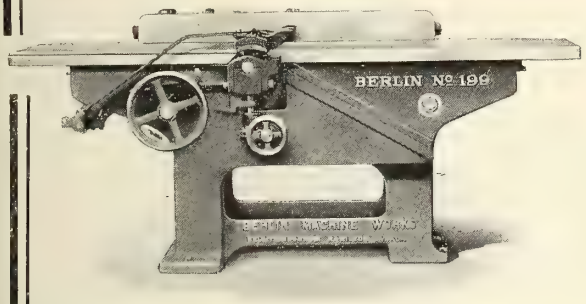

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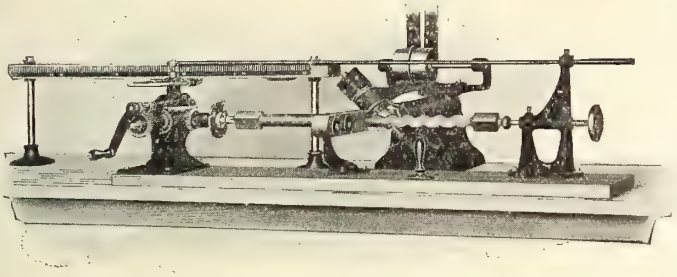

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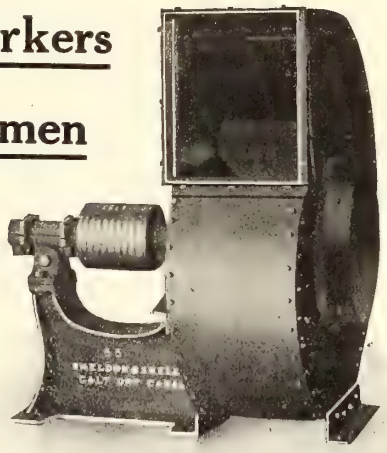

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Vol. 15 **April, 1915** **No. 4**

Adaptability the Keynote to Success

AS an instance of the enterprise which some firms are showing in adapting themselves to the new conditions brought about by the War, the following extract from a letter received by The Canadian Woodworker from The North American Bent Chair Company, Limited, of Owen Sound, is interesting:

> "Since the War our principal market, Australia, has been cut off, the Australians having imposed a prohibitive tariff, which has made it impossible to ship chairs to that country.
>
> "This necessitated our getting out designs for the English market and installing special machinery and appliances. With our new equipment we think we shall be able to compete favorably with any country.

The extract is from a letter sent us in reply to our request for information as to what, if any, special steps the firm was taking with a view to working up an export trade in bentwood chairs. We are told that The North American Bent Chair Company have been looking after this branch of the business for over twenty years, and that more than one-half of their output has been sold in foreign countries.

In the extract we have quoted there is the text for a sermon whch should read wisdom to every woodworking industry in the Dominion. Too often, when even a part of one's business has been cut off, let alone one's principal market, there is a tendency to stick around—like Micawber, "waiting for something to turn up."

The only way to get business is to go after it. If the War has exerted a particular handicap in one line of manufacture, substitute another for it; if one field is closed, open up another. "Not always possible!" the reader may say. No, not always; but it is in nine cases out of ten—and in the tenth instance, if we were quite sure that the bottom had really dropped out, we would turn to pastures new and try a hand at something else. The moot point is that activity is a better paying proposition than inactivity, and that optimistic, constructive effort is more likely to bring grist to the mill than apathetic resignation to the idea that it is no use trying for business in such times. There is all the use in the world in trying for what business is going, and for some of the business that is not going now but that will be going if we dig it up.

Apart altogether from the question of the loss of life occasioned by the European conflict, the War has not been an altogether unmixed evil. It needed some great volcanic force to cure us of the business lassitude into which we had been drifting. The War has stirred men's blood; it has put an edge on the blade of competition as well as on the swords of those who are contending on European soil; it has emphasized the value of economy, and shown us that in business as well as in private life the wisdom of providing against a rainy day cannot be gainsaid.

Let us bear these things in mind, making the best of a bad job, and take an active individual part in promoting business enterprise. For a few suggestions as to how this may be accomplished we direct the attention of our readers to the contributions submitted in our Prize Letter Contest and published in this issue.

When Dog Eats Dog

ONE of our correspondents directs our attention to the fact that some of the large furniture dealers have been taking advantage of the dull times by going the round of the manufacturers and obtaining reduced quotations by playing one against the other. He tells us that this has accounted for the cut in wages which has been introduced in a number of woodworking plants. To our mind, there is no better illustration of the biblical simile of a house divided against itself. We have it on divine authority that such a structure cannot stand; and we give it on our own authority that an industry operating under like conditions will soon go to the wall. It is a case of dog eating dog, with all the satisfaction of the repast going to the dealer. If the furniture manufacturers would combine in an effort to obtain increased trade on the sound principles of manufacturing efficiency and value for value, leavening the whole with a generous helping of publicity, they would be doing something worth while. If they engage upon any cut-throat campaign of eating one another up they will not only lose their trade, but they will lose every efficient workman in their employ.

Be it remembered that the man behind the bench is the important factor in the situation; he can pick up his tools and turn to fresh fields and pastures new when the conditions imposed upon him are made intolerable or unprofitable; but the man with the plant

and equipment, the established property, the local investment, must remain.

We urge a strong plea for maintaining prices all round and continuing the same rate an hour to the worker, even though a reduction of hours be found necessary in some plants. What greater folly could there be than bartering the industrial upbuilding of a decade or perhaps a quarter of a century for temporary profit or convenience? It is selling one's heritage for a mess of pottage.

The readjustment of the War has brought about many requirements, of which **the chief is stability, and all the rest are enterprise.**

Chatham Man's Success

MR. Robert J. Truax, of Chatham, Ont., who won the second prize in the March Essay Contest with an article on "Planing Mill Savings" (published in our last issue) is an Ontario man, he having been born at Walkerton

Mr. R. J. Truax, of Chatham, Ont., who won the second prize in the March Essay Contest of The Canadian Woodworker.

thirty-seven years ago. He made his first connection with the woodworking industry when he was sixteen years of age, starting in with an uncle, who was the head of the firm of R. Truax and Company, of Walkerton. At the outset he acquired a good practical experience in all the departments of a saw mill, planing mill, and sash and door factory. He went to Chatham about twelve years ago, first taking a position with Messrs. John Piggott and Sons, for whom he worked as a machine man on sash and doors. Afterwards he went to the Blonde Lumber Company, and later still he put in a year in charge of the frame department for a firm of Detroit building contractors. Returning to Chatham, he again made connections with Messrs. John Piggott and Sons, and he is now in charge of their machine room. Some time ago Mr. Truax took a correspondence course in architectural drawing, which, he tells us, has been very helpful to him in his work. The second prize-winner appreciates the value of taking pains, and he is a warm supporter of the trade journal. He has contributed several articles to The Canadian Woodworker.

Waste Products Save Big Annual Outlay

The degree to which what were formerly waste products are utilized in large manufacturing establishments is surprising to anyone not familiar with all these present-day methods. Many a large plant is able because of the extent of its operations to greatly reduce manufacturing costs.

In the Toledo plant of the Willys-Overland Company, utilization of sawdust and scrap from the wood working departments alone saves $40,000 a year in the coal bill.

To operate the Willys-Overland drop forge plant, in which there are 60 steam hammers, and to heat the 25 acres of new buildings just completed, requires 10 huge boilers of a total capacity of 3,800 h.p. These boilers would consume 200 tons of coal for every winter day, were it necessary to use coal. The use of the waste from the wood-working shops saves almost one-third of this, and practically eliminates the need of coal in summer, making in the course of a year the enormous total saving above mentioned.

The interior of the Overland wood-working shops is entirely free from shavings, sawdust and other scrap material. Large tubes lead from the point on every machine where this waste drops to a central point beneath the floor to which all the waste wood products are drawn by a strong forced current of air. The scrap is taken from this point by an endless leather belt to a powerful wood grinder which completely pulverizes the entire mass.

This crushed wood is blown by electric fans into huge bins located above the furnaces; chutes from these bins lead directly to the fire pots, into which at stated intervals a fixed quantity is released automatically.

Value of Birch in Wagon Work

IN the construction of a wagon wheel, writes a U. S. wagon manufacturer, we find the black birch of Pennsylvania and the New England States, and also the yellow birch of Wisconsin and northern Michigan, the very best woods that can be secured for the hub. It does not have the tendency to check and split open that is so characteristic of oak. We have adopted birch entirely in our work and have found since having done so that our loss on account of the degrading had been reduced to a minimum. We find birch will retain the spoke in the mortise fully as well as any other wood that we have used. For other purposes in the construction of the wagons we have not adopted it for the reason that in such grades as we would require it, it has not been advantageous from the standpoint of cost. There is no question, however, but that in the construction of dump wagon boxes it is fully equal to any other wood that can be secured, as it is very firm, slow to rot and durable. We understand that many of the eastern wagon concerns have used it quite extensively in this connection. We believe it would also be a very good wood to use for the construction of log wagons and some parts of farm wagons for bolsters and sand boards, but the price would be prohibitive in this connection.

It may be the number of feet going through the mill that makes the sawyer's tally, but it is the quantity and quality that he gets from each thousand feet of logs that finally makes his reputation—and is often a deciding factor in the mill's chance for profits.

Prize Letter Contest: How to Promote Activity in the Woodworking Trades

Many interesting communications were submitted in connection with the Prize Letter Contest announced in our last issue. The first place and the prize of $10 goes to Mr. U. E. Germain, of Montreal, for his letter published below under the author's own heading, "Why I Do Not Sell a 'Made-in-Canada' Fir Door." The award is made on the basis of the originality of the composition and the sound common sense principles which it enunciates—principles to which The Canadian Woodworker subscribes enthusiastically. Mr. Wm. G. Colgate, of Toronto, is a close second—but the remaining compositions are so good that any further distinction were invidious. The subject of trade development lends itself to a discussion which may well prove useful and constructive, and we shall be glad to have further letters for publication.

Why I Do Not Sell a "Made-in-Canada" Fir Door

Editor Canadian Woodworker:

When this "Made-in-Canada" campaign first started I was rather uncertain of its effect upon my trade in general and my line in particular. I was selling a foreign-made fir door, and I kept a close record of the movements of the trade and of its disposition to the new sentiment. Naturally I thought my sales would decrease so much as to force me to look for a new connection and sell "Made-in-Canada" doors, but several months have passed since this campaign began, and I am still selling foreign-made fir doors, and have no fear now of any decrease in my sales.

The most interesting point of all my records on the subject is that ONLY ONE DEALER mentioned the origin of my doors. This dealer had never bought any doors in carload lots before, and he took the trouble to get prices from several manufacturers and jobbers before placing the business. I got his order because my prices were right, because my door was sold by many large dealers in Canada, and because it was known by all to be the same reliable door of twenty-six years ago—a door of quality and strict standard. This dealer's patriotic impulse gave way before his economic and business principles; and, as a result, he saved about $80 on the purchase of this carload, besides getting a door which he knew beforehand to have passed the experimental stage. He himself said that the amount he saved paid his unloading expenses and the interest on his investment for a few years—even if he had to stock the doors after getting them.

If the Canadian manufacturer does not secure the bulk of the Canadian door business, he has no one to blame but himself. He should not attempt to secure business by appeals to patriotism or by prohibiting the importation of foreign-made fir doors. These are not sound business tactics. The Canadian manufacturer should attempt to secure business on the real value of his manufactured article and his prices.

The great trouble with several home manufacturers is that they devote too much attention to the selling end and not enough to the manufacturing end of their business. Their claims department is always overworked, while their order department has an easy time. The manufacturer should spend less in selling and more on expert workmen and better equipment. It takes a good article to keep the business and make a dependable market thereafter. The consumer who is satisfied with an article will often pay a longer price for it rather than take any chances with an article unknown to him.

The salesman handling the product of a factory three thousand miles away knows the importance of goods up to scratch. He knows that the dealer is not easily persuaded to give a second trial to a firm that has once failed him with a poor or a wrong shipment when he was in a hurry for his stock. If the dealer accepted the shipment to save time, he curses the manufacturer every time he sells the goods, as they do not please his customers and are a source of continual worry to him. If the dealer refuses the shipment he will never forgive the salesman and the manufacturer for the loss of business caused by the long delay in securing a second shipment from another firm. It takes from six to ten weeks to get an order through and delivered. Patriotism is only skin deep with the dealer; he wants the best and cheapest for his money all the time; he wants an article that he can depend on himself and that he can back up in his own trade regardless of the country of manufacture.

I do not think the Government should endorse the movement of the Canadian manufacturers to prohibit the importation of American doors and thus enable them to sell their output at advanced prices. Let the Canadian consumer get the benefit of the economic and scientific manufacturing methods of the foreign manufacturers, and let the Canadian manufacturer learn to manufacture the articles to meet the American prices if he wants to get the business of his own country. I understand that this principle does not apply to foreign-made goods; I am referring to the manufacturing of fir doors and fir products in general. Several of your readers know that fir doors are manufactured on the Pacific coast, some in British Columbia and some in the State of Washington. The cost of the raw material is about the same for either manufacturer; the freight rate on the finished article to Montreal is five cents per cwt. more for the American door than it is for the Canadian door; the American manufacturer has a **duty** handicap of **thirty-two per cent.** Despite all these extra charges and additional costs, the American door is sold delivered in Montreal for the same price and even cheaper than the Canadian door, and it has created a market on its own merits.

Why cannot the Canadian manufacturer sell a door as good, as uniform in quality, and as recommendable, for less money than can the American, since the Canadian manufacturer has no such handicaps as the advance freight rates and the duty tax of 32 per cent.?

It would seem that the Canadian manufacturer is either too greedy for large profits or that his manufacturing processes are antiquated.

The Canadian manufacturer must master his cost of production and bring down his prices to the level of his competitors' figures before he can appeal to the consumer. Let him turn out an article that will be self-recommendable and at the same price as his competitors, and he will get his full share of the Canadian business and soon will shut out the American manufacturer altogether from this market. When this comes to pass I will be the first one to push the sale of "MADE-IN-CANADA" doors, but until then I must sell a door **not** made in Canada, since I cannot depend upon the patriotic fund to feed my family.

Yours truly,

U. E. GERMAIN (Montreal)

Opportunities at Home and Abroad

Editor Canadian Woodworker:

Canada is a large importer and a large borrower. If she is to continue buying abroad and paying interest on her borrowings, she must sell. European countries will require all Canada can produce, and if we are to take advantage of our opportunity we must increase the production, not only of live stock and farm products, but also of manufactured articles. Canada's trade will profit by the war only to the extent that the Dominion seizes the opportunity of developing her resources on a wider scale. Markets, no matter whether national, Imperial, or foreign, can be won and held only in the proportion that the "Made-in-Canada" product competes with the foreign article in quantity and quality. Wherever you go you will find that the buyer wants the most and the best for his money.

Industry should begin at home, and we should strive for home industries. An effort should be made to improve every opportunity. An increased consumption of "Made-in-Canada" goods would mean a cut in the cost of production, thus enabling the Canadian manufacturer the better to meet competition in other markets.

As to tariffs, I believe that in a new country like Canada they are essential to a certain extent; but I fail to see any permanent benefit to the masses, as in many cases it is taking from one and giving to the other. We have much to learn from the methods adopted by the older countries, many of which have built up a huge foreign and home trade. We are inclined to follow too closely the methods of the United States. It might be to our advantage to pay more attention to British methods, which are held in high regard in all parts of the world.

Taking the lumber and woodworking industries, it is of interest to know that last year the United States exported to Canada wood and wooden articles to the value of twenty-three million dollars. Most of these articles could have been produced in Canada.

Then there is the furniture line. There has been, and there will continue to be, a sure demand for school desks and other school supplies; and there are other items in the import list which are well worth looking into.

As to our trade with other parts of the Empire, I have had some years' experience in the West Indian colonies. There, although a great quantity of wood is used, Nova Scotia pine is about the only Canadian wood employed to any extent. Maple flooring would have a good chance if it were introduced, and so would doors and furniture, if they were made to suit the climate. Only once during the years that I was there was Canadian woodwork brought before me, and that was by an Ottawa firm trying oak veneered doors; but as oak is not suitable they were not used to any extent. Pitch pine from Florida is used a great deal for all kinds of building work. Furniture is either native-made or is imported from the United States, Great Britain, Germany or France.

In all tropical countries there should be an opening for a fairly good class of furniture in cedar, mahogany, birch or elm, as oak is often attacked by insects, which bore right through the wood, leaving only a skin after two or three years. The native-made furniture is mostly of cedar, but it is crude in workmanship, it being made entirely by hand; and it is expensive. There is a considerable Venezuelan trade in furniture done through Trinidad, B.W.I. Most of this goes to the countries named above.

All the South American countries should offer a very fair field for Canadian trade. Names of Canadian manufacturers should be placed on the Colonial list, so that direct intercourse might be had with the Crown Agents for the Colonies.

I am reminded of another item in this trade, and that is ready-made or ready-to-build houses. Usually there is a good demand for these structures, and many firms in Great Britain make a specialty of building them. Judging from my experience, however, the Canadian style of building would suit much better than the European style, only that we should have to allow higher ceilings, as in these climates a height of at least twelve feet from floor to ceiling is required to make a comfortable room. Another thing is that most of the framing is mortised and tenoned and pinned to withstand earthquake shocks. I have no doubt that it would be profitable for some of our Canadian firms to make inquiries about this trade, especially at a time when Germany, the main competitor, is out of business.

These are a few things that come to mind; doubtless there are many others. I endorse the principle enunciated in many of the former letters—that to promote trade, especially in new markets, one must advertise. Trade will not come to us: we must go after trade.

Lastly, we require technical training and experimental work; but this is a subject which some abler writer might well take up I am afraid that I have already exceeded the space limit.

Yours truly,

KENNETH McGILVRAY (Dundas, Ont.)

Made RIGHT in Canada

Editor Canadian Woodworker:

Behind every effort to profit by the opportunities presented by the war should be a determination to hold the business when the conditions of competition return gradually to normal—not to manufacture for the emergency only, but to establish permanent industries.

But how have Canadian manufacturers attempted to act on this principle?

Recently an officer of a large institution tried to secure in Canada a lot of bentwood chairs, similar to the Austrian variety, for dining-room use. "We wanted," said he, "a style as good and as comfortable as those we had already." Some difficulty being experienced in selecting a suitable design, a chair was chosen costing as much as the imported type, but distinctly inferior to it.

Close upon the heels of this came the case of a large restaurant owner who wanted two hundred bentwood chairs bearing the "Made-in-Canada" label. He likewise was forced to accept something "just as good" which was not as good. Why should this be? Surely our numerous hotels, clubs, public dining-rooms and assembly halls afford a sufficiently large and lucrative market. The Austrian chair costs about $3.50 here. Canadian chairs, I understand, run from $2 to $8 or $9, with the $6 chair almost as good, but not quite.

Any attempt to increase Canadian trade must reckon with the retailer. In line with educating the public to the aesthetic as well as the economic advantages of good furniture, assistance should be given the dealer in pushing the better product. Usually in retail selling the quality argument is ignored, while low price is played up. The superficial qualities of the cheap, meretricious piece are "spotlighted," while the better class of furniture is left to fight its way to recognition alone and unaided.

One would imagine that the prospect of retaining in Canada over three million dollars spent yearly on imported furniture would stimulate Canadian manufacturers to unite in a definite course of action. For example, an educational campaign could be organized over the signature of "The Associated Furniture Manufacturers," which would have for its primary object—aside from the exploitation of Canadian furniture—the development of a refined taste in home furnishing and of a proper appreciation of the effect of envir-

onment on character and the part that good furniture plays in making a home. Suggestive illustrations of interiors could be shown in each advertisement to emphasize the points in the text.

Newspapers carrying the advertising could help materially by publishing once a week a signed and illustrated article treating of some phase of home furnishing. By virtue of this special matter retailers of furniture, wallpaper and decorations could be influenced to take space on the same page, and thus a healthy public sentiment would be aroused in favor of good furniture which could not but be beneficial to all. This, of course, is merely the skeleton of an idea which could also be applied to the manufacturers of doors and specialized woodenware.

Limitations of space preclude a discussion of the possibilities of export trade, but there is no doubt that it offers great opportunities for the development and extension of Canadian commerce, particularly in South Africa and South America, where, through the agency of Canadian branch banks, a credit system could be built up and collections greatly facilitated.

In conclusion, "Made-in-Canada" is all right as far as it goes, but—

Made RIGHT in Canada

is somewhat more expressive. It gives us an ideal to work by towards "establishing permanent industry," at the same time furnishing an economic reason why the article bearing it should have the preference of the Canadian and foreign buyer.

Yours truly,
WM. G. COLGATE (Toronto)

Wake Up, Manufacturers!

Editor Canadian Woodworker:

The Canadian manufacturer cannot fail to be interested in any movement designed to promote trade in Canadian-made furniture, not only in Canada, but throughout the Empire.

In the last issue of the Canadian Woodworker, Sir George E. Foster speaks of the need for adaptation and resourcefulness, recommending that every effort be put forth to hold the additional business upon the return of normal conditions. This advice is of the right kind. What the Minister of Trade and Commerce has in mind, though, can only be accomplished by maintaining the quality of our manufactures and keeping our prices reasonable.

The fundamental basis of trade expansion is efficiency. This principle cannot be emphasized too strongly at the present time. It should not be overlooked in impressing upon our manufacturers that they should make the most of their unparalleled opportunity to extend their overseas trade.

The question arises whether our manufacturers are reaching out for the new business which is undoubtedly offering. What, for instance, is being done to secure a portion of the British market for pianos and furniture? Is there sufficient appreciation of the fact that up to now between eighty and ninety per cent. of the pianos imported into Great Britain have been of German manufacture? The war has broken up Germany's business in this field and opened up a large market for somebody else. Why should not that market be for Canadian manufacturers? There is no reason why we should not go in and prosper, if we are prepared to adapt ourselves to British requirements in design and make. Adaptation is the key to the situation.

Another great industrial field is opened up through the withdrawal of German competition from Australia and South Africa.

Besides pianos, Great Britain affords a large market for various lines of furniture which have been cut off from Germany and Austria.

During 1912, German exports to British Colonies in furniture, upholstered goods, etc., amounted to nearly three million dollars, and Austrian exports to some five million dollars.

I was on the road for a few years in England, and frequently I came across furniture imported from the United States. This had been sent over mostly on the "knock-down" principle. Are Canadian manufacturers going to sit still and allow their United States competitors to go in and possess the business which Germany and Austria have lost? Is it good enough to pass up such an opportunity? The same thing applies to the South African and South American markets for furniture manufacturers.

The ground has already been looked into by some of the United States manufacturers, who have shown considerable enterprise by sending out agents to look into the exact requirements of the trade. There is no reason why we should show less enterprise.

The possibilities of developing trade within the Empire need not deter us from going outside of the Empire for a little business.

Of course, there can be no doubt that there is great scope for more united action right here in Canada. Opportunity can be of little avail unless Canadian manufacturers make up their minds to remodel their business methods on the lines of efficiency and economy. The trade has need for really competent men in successfully launching Canadian goods into Great Britain, or British goods into Canada or any other parts of the Empire—competent men to direct and advise prospective buyers. This point is illustrated very clearly in Mr. E. T. Nesbitt's letter published in the March issue of The Canadian Woodworker.

Manufacturers cannot exercise too great care in choosing their agents. The man who is always on the spot, knows his business, and can furnish the prospective buyer with the essential information that he requires is the man who is going to swing the order his way. Mr. W. J. Beattie, of Owen Sound, makes a strong point when he advocates more extensive advertising. The Made-in-Canada movement is not going to advance very far by the excitement of the moment: its success depends upon extensive, well-balanced advertising, and a high standard of workmanship. The advertising, moreover, must be consistent and persistent. Some manufacturers will advertise their goods for three or six months and then withdraw, achieving no results. This appears to me to be a mistake. Watch the snow as it falls, flake by flake, very softly. No one flake calls for special remark, and yet the accumulation of a sufficient number of flakes produces an effect which no one can fail to notice. In advertising, of course, the campaign must be backed up by the finished product and good service.

Furniture valued at three million dollars was imported into Canada during the fiscal year ending March 31st. How to keep that money at home is a problem well worthy of the attention of our furniture manufacturers. There is one thing sure, in my opinion, and that is, that the trade will not be kept at home by so-called protective measures that will close the Canadian market to outside competition. Such measures will result merely in cutting us off from the outside world.

The situation arising out of the present troublous times demands calm thought and deliberate judgment. In these

days, the Canadian manufacturer is undergoing a searching test in regard to his strength and aggressiveness. If he would displace his outside competitor, he must get after the business with a fixed purpose, and compete in quality as well as in price. Sitting still and waiting for the business is one way, but the other and the preferred way is to get out after the business.

In closing, I can only say that if any change is to be brought about it must come through the manufacturers themselves, through better plants, through the application of more modern methods and the improvement of the finished product through quotations at right prices, and through the medium of advertising.

Yours truly,

ALBERT HUDSON (Hespeler, Ont.)

The Development of Furniture Manufactures in Canada

Editor Canadian Woodworker:

It is generally conceded by men who are quite competent to judge that ninety-five per cent. of the furniture factories in the United States are from five to twenty years behind the times in comparison with factories manufacturing metal products, and doubtless the same holds good in Canada.

Why should this be so? Woodworking is a much older development than metal working, and it would seem, therefore, that lack of progressive methods is the answer.

There are very few, if any, furniture factories in Canada that approach, in building, equipment and general efficiency, the ideal attained by a great many manufacturers in other lines. Why?

In the first place, we will consider the men employed in the factories. For the most part, they are taken in quite raw and are set to work at some task at which in the course of a few months they acquire a certain degree of efficiency. At any other operation, to a greater or less extent, the same thing has to be gone through. Under the circumstances the wages paid cannot be sufficient to hold the man when business is fairly good, and the result is a constant change and loss to the manufacturer.

There is practically no effort among either employers or employees to better this condition by a certain amount of technical training so as to improve the usefulness of the furniture factory employee and thus make it possible to pay him as good a wage as he could earn in any other trade.

Time and time again I have seen bright young men drift into other occupations because the employer either could not or would not see the advantage of retaining the services of those who, with proper handling, would develop into splendid assets to the business. The best and the hardest thing to get in manufacturing is a really good lot of men—the ones who have the snap and vim to turn out a good product in the best and quickest way possible. Because the rate of wages is low, or because the average wage is under a certain rate an hour, it does not follow that the manufacturing costs are low. There are many people who think so, though.

Canada is suffering from lack of really competent men in her woodworking industries. Until that lack is supplied there will be a big handicap on the business. A few years ago, when business was so good and men were hard to get, some manufacturers tried to fill the gaps by getting men from the Old Country. While for the most part very efficient, these men were almost totally unused to our methods of manufacture, and although some of them stuck to their posts until they became really useful, the greater part drifted into other trades, where they could earn more money. The native Canadian is the quickest and most versatile man you can get: all he needs is the proper training and handling, and he can beat them all.

The Commission on Technical Education appointed by the Government several years ago collected a great deal of useful information regarding the trade and technical schools of all the principal countries. Their report makes very interesting reading, and shows plainly just what kind of painstaking methods are adopted in the older countries to turn out competent help for the manufacturers, who themselves take considerable interest in the classes, and in many cases allow their younger employees so many hours off each week to attend them.

The great difference between the Canadian and the European must not be lost sight of. The former is born in a country where there is more than elbow room for all, and he is not foreordained to work in a factory just because his father does. No, he flits from this to that, wastes the most precious years of his life in finding out, or trying to, what is his particular bent, and very often when he wakes up it is too late.

There are any amount of men working at industrial pursuits who are not at all fitted for that life; on the other hand, there are plenty of men studying for professions who would make first-class mechanics. One of the troubles with us Canadians is that many of us think it so much nicer to have our boys work at something that will not soil their hands, and we turn them loose in some calling that does not ensure them a living.

I should like to say a god word for the manual training department of our schools. If a boy shows a mechanical or artistic bent it should be encouraged, so that he may develop into something useful to himself and the community. The care and development of the workers are all the woodworking industries of this country require to enable them to hold their own against the world.

Yours truly,

W. J. BEATTIE (Owen Sound, Ont.)

Efficiency and Specialization the First Requisites

Editor Canadian Woodworker:

Excepting emergency requirements, the "opportunities" were here before the War, and they will remain after the War.

In what we call staple lines the tariff—high or low—is not much of a factor. For instance, what we know as kitchen Windsor chairs are sold in Canada more cheaply than in the United States, where the demand is ten times as great—the reason for this being that lumber is as cheap, just as good machinery is available, not much skilled labor is necessary, and the quantities required for an economical cut can be handled by our factories. Labor, material and quantity being favorable, we are on an equality with our neighbours, and home competition is keen enough to regulate the selling price. This same condition exists in the reed line, in which we are engaged. The amount of reed goods shipped in from the United States is negligible, because our prices are as low here as across the border, and home competition would not allow us to take advantage of the tariff were we inclined to do so.

So that in this case the tariff conserves the market for Canadian manufactures and labor, without costing the public a cent.

When we approach the export market, however, a different situation confronts us. We face competition from China, with labor at 20 cents a day instead of $3; from England, with labor at $8 a week against $18; and from other countries in proportion. And since labor is so large an item in the manufacture of most woodworking lines, it

would be foolish to enter the export field. Then, again, there are the banking facilities; continental manufacturers who are financially sound can discount paper from three to six months against foreign shipments. We know what our banks would say if we asked this privilege.

Again, there are the shipping rates. England can ship to New Zealand and Australia at half our rates, and in some cases this is a serious handicap.

On the other hand, it seems to me that we have an opportunity to absorb into Canadian manufacturing a large amount of goods hitherto imported, and that this is a duty and a privilege to which we should all apply ourselves. We stand most in need of efficiency and specialization. Let chair factories make only chairs, and have all their equipment and lay-out planned for this work. The same applies to bedroom and dining-room furniture. Upholstery might be divided into a line of cheap goods and another of better quality, and so on throughout the whole furniture woodworking trade. It is impossible for the same factory to make all grades of furniture efficiently and economically—and yet this is attempted by so many of our industries.

To my mind, this is the solution, and as soon as it is followed our industries will begin to produce a quality commensurate with the price asked, replacing imported goods, to the advantage of us all. Advertising and tariffs will contribute their parts, but the consumer and buyer will be secured permanently only by supplying superior goods at a reasonable price. The buyers are waiting to see whether Canadian manufacturers will rise to the emergency. I believe they will.

An effort on our part should also be made to use wood from Canadian forests as far as possible. Canadian birch for hardwood has no equal. Yet we find public institutions specifying oak furniture where birch could replace it with profit and patriotism.

Yours truly,

H. W. STRUDLEY (Stratford, Ont.)

Prod the Retailer

Editor Canadian Woodworker:

In my opinion, Canada has great industrial opportunities within her own borders. Much could be accomplished for the woodworking trade if furniture retailers would do more advertising and make special bargain days on a line of small articles that would appeal to the mother and daughter. It is the women who read the advertisements in the local papers, and they are the ones to influence in the direction of buying new furniture for the home. If we can keep the dealer prodded up, and impress upon him the advantages of a publicity campaign, we shall accomplish much for our factories. In my opinion, this is the secret of building up business in Canadian-made furniture,—all of which is an endorsement of what W. J. Beattie, of Owen Sound, wrote in the March issue of The Canadian Woodworker.

Yours truly,

"A READER."

Don't hold the price tag of a new machine too close to the eye. If high, it may obscure the advantages, and if low, the disadvantages of the machine, and later money matters in the shape of profits may be seriously affected.

Bright, clean machines may not do any more or better work than dirty, greasy machines, but they make one think that the mill in which they are operated is up to date and well managed. Then, too, the insurance man never fails to note the difference.

Canada and German Trade

By the London, Eng. Correspondent of The Canadian Woodworker

THERE can be no doubt that whatever other results accrue from the present titanic struggle Germany is bound to lose a great proportion of the trade she has so assiduously built up in the last twenty or thirty years. The industrial genius of the Germans, their methods of intense application, their highly organized system of government, have made the nation a great industrial community whose wares, stamped with the impress of their painstaking efforts, have been found in every market of the world. The Kaiser—apart from his heroics about "mailed fists" and "shining armour"—has been in a sense the managing director of a business Empire and even on the question of war its commercial aspect has, it is to be feared, been the foremost consideration, with expansion as its most hoped for result. Their ruthless onslaught on the peace of Europe has been coldly calculated as a business proposition, and not the least of their eventual loss will be the disintegration of the trade they have built up as the central expression of their national activity.

With the prospect of such a volume of business being diverted into other channels, it is not surprising that organized efforts are being made to secure at least a substantial portion of it, an effort in which the United States has taken a very active part. It is, however, up to the British Empire to see that this portion of the legitimate fruits of her coming victory is as far as possible secured for the Empire, and Canada has her part to play in the active competition for German trade which is now proceeding.

More Business Than Usual

The first point to note is the prevailing optimism respecting the business side of the war. Great Britain spontaneously adopted the motto "Business as usual" during the war, and if there is need of another slogan when peace is signed it might well be—judging from present indications—"More business than usual"! No one has yet written a book on the "Psychology of Commerce," but mental attitudes and national sentiments play an enormous part in the stimulation of trade between countries. This optimism—I had almost written enthusiasm—will find its first expression in a strong national desire to realize that inter-Empire commercial solidarity of which—without touching politics—the late Mr. Joseph Chamberlain may be regarded as the most energetic advocate. In the past England has been indifferent as to whether she bought from Germany or from the great self-governing colonies. She has been Germany's best customer and this often to the detriment of those who had a closer claim. That must never be so again. Never again, it is hoped, will the present generation of Englishmen buy abroad where it is possible to purchase from Canada or other of England's colonies.

Empire Consciousness

To one who has witnessed the warmth of the welcome given by the English people to the Canadian troops, the thrill of joy and pride and gratitude at their coming into the struggle to aid the Old Country, it was easy to realize that the Imperial sentiment in its best sense had ceased to be the prerogative of a political party and had become a national enthusiasm. This sentiment, which, for want of a better term, I will call "Empire Consciousness," will inevitably find its expression not only in increased trade between the

Mother Country and the Colonies, but in a desire financially to equip the latter with the means requisite for augmenting greatly the present possibilities of competing with Germany for the industrial markets of the world. And Canada, the nearest of our Colonies—with a territory nearly as extensive as all Europe—will be the first to feel the effects of this new impulse.

Timber and Fuel

Canadian developments must follow closely the line of her own resources. There should be a big market for small wood manufactures for domestic and other purposes. Barrel making and cooperage is another industry capable of expansion, while in the toy trade, which Germany has hitherto made her own, wood is the material chiefly employed. A class of wooden toys (perhaps of quite new design) made in Canada of Canadian lumber, should find a ready market in the Old Country. America invented the Teddy bear—the descent to such a puerility must be pardoned—but Canada might not only invent a new class of wooden toy but might see that she keeps the resulting business for herself. The small waste timber from such industries could be worked up into briquettes—a subject which, in relation to peat and coal, has already been carefully investigated for the Department of Mines, Ottawa, by Mr. E. Nystrom. The method of patient, careful investigation which has been applied to the briquette, or patent fuel question, would be fruitful of happy results if applied to the other industries mentioned.

Wood Paving Blocks

Wood blocks for street-paving purposes offer another field. The day of the hardwood block, as the only suitable material, has passed, and the opinion among engineers, or among the bulk of them, is that there is little to choose between hard and soft wood so long as the blocks in either case offer equal resistance to wear. A soft wood with a sprinkling of harder blocks is equally bad with a hard wood with a sprinkling of softer blocks. Speaking on this matter of Canadian supply, a writer in the "Surveyor" points to the fact that the Baltic timber trade is mainly controlled by Germans, and this not merely at the moment, but in ordinary times, owing to the fact that Germany has controlling capital interests both in the principal Russian and Swedish timber companies and in timber shipping. "If this is so," he asks, "will the effect not be detrimental to the future use of wood blocks for paving purposes, having regard to the fact that these are mainly cut from timber emanating from Baltic ports? Is it not to be hoped that it may prove possible, by means of the new powerful Canadian ice-breakers which are now at work trying to maintain an open passage through the ice to the White Sea, for timber shipments to continue to come in sufficient quantities from Archangel? But is it a fact that, as a rule, trees grown in such far northern latitudes do not mature to sufficient size to be suitable for cutting wood blocks? As it is an ill wind that blows nobody good, may not one result be that we shall encourage Colonial timber growers to meet our requirements? Should not Canada be able to furnish suitable timber for wood paving blocks at a reasonable price?" Freightage would appear to be the only obstacle.

Intensive Industrialism

What is known as the "intensive" method of culture can be applied equally as well to industrial as it has been to horticultural work. The growth of Canada's new industries must be based on thorough scientific investigation, and the best methods of production, transport and marketing must follow. Canada, like Great Britain, can learn much from the methods of the enemy. Careful State encouragement and help have made all the difference to German industries. The German State co-operates and plans for the enlargement of the industries of its citizens. Financial arrangements are made to facilitate commerce. The banks have a strong industrial aspect. The leading German banks are identified with the various industries of the country to a much greater extent than is the case in England, and the smaller manufacturers or pioneers of new enterprises can invariably rely on financial support for their undertakings. Germany's representatives throughout the world have constituted a picked body of "intelligence officers" for Germany's commerce. The same spirit of thoroughness, method, enterprise and enthusiasm which pervaded the nation at home was shared by her representatives abroad. If "Deutschland uber Alles" has not been realized commercially it certainly has not been for want of trying. In London the feeling amongst business men is that for England, at any rate, there is need of a new spirit which can be formulated as "being in business for love of the game." A keen enthusiasm is already manifest in some circles. It will spread towards the close of the war. We shall have no use for party politicians who make the nation's commercial interests pawns in their own game, for consular representatives who represent only the diplomatic side, or for red tape and obsolete forms handed down from early Victorian days. There is a new spirit abroad—the spirit of ambition, enthusiasm and a determination to "win out."

System, Enthusiasm and Efficiency

The old unfortunate watchword "muddling through" will give place to a new motto, "system, enthusiasm and efficiency," and this spirit suffused with a warm humanity will, it is hoped, animate both the Old Country and the Colonies in their future great achievements. It is said that an American engineer who made a tour of German factories and machine shops declared that Germany was twenty years ahead of even America, where the one unpardonable sin is to fail to be "up-to-date." If this is so, it shows how we have slacked and lost ground in the past. We must make up in the future. The writer has refrained from quoting figures from blue books or white books or year books or what not. Statistics, valuable as they may be in normal times, are at the moment of less importance than psychology. If the newly awakened impulses towards scientific progress, towards closer co-ordination of effort, are wisely directed by the leaders of both Great Britain and her great Colonies, a few years will suffice to bring the Empire to a position which before the war would have been deemed impossible of achievement.

The inlaid flush-faced door seems to be gaining in favor right along, and by and by we may see this type, in the somewhat lighter form, a favorite in home building.

When you feel the need of fresh air in the glue room on warm days it is well to bear in mind that drafts often do damage to freshly-spread glue, and that there is a difference between drafts and proper ventilation. You can get the ventilation and fresh air without the damaging drafts.

Efficiency in the Sanding Room

The fourth of a series of articles touching on sanding efficiency. Herein the author endeavors to show which grades of paper are best for sanding various textures of wood

Especially contributed by H. H. Allen

WHILE the journeyman may possess what he considers a most complete knowledge of sand paper and its relation to quantity and quality of sanding machinery production—the term "sand" paper used here is intended to embrace all types of grit paper used in sanding machinery—and may feel, because of experience he has had, that his deduction or analysis of the matter is right because it has worked out practically, the less experienced sanding machine operator frequently feels at a loss as to "which" grade of paper to use for different work.

We can appreciate the situation of the operator new to the game who has just had a lot of Southern pine, cypress or a similar gummy wood delivered to his machine with instruction to "rush" it through. The finish must be fine, especially one surface which will be exposed. Because of this the operator either uses the paper already on the drums, thinking that its somewhat dulled cutting edge will give the desired finish, or puts on new paper, possibly No. 1½ on the first drum, No. 1 on the second drum and No. ½ or No. 0 on the third drum.

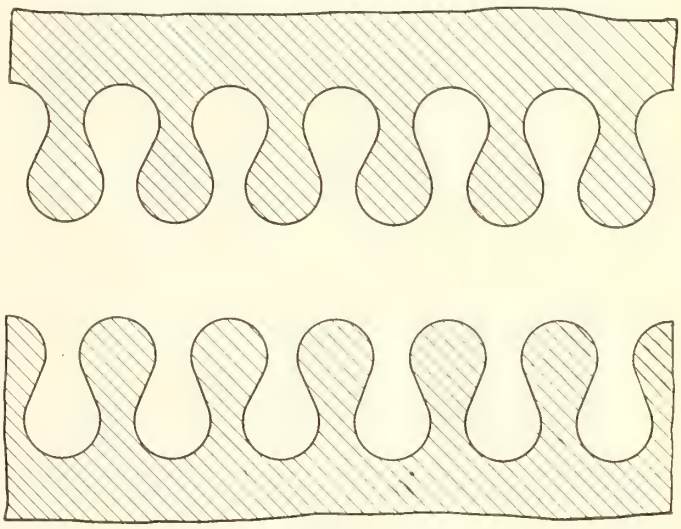
Right from the start he has trouble. The paper rapidly fills up, because of the gummy nature of the wood, and burns the stock, often refusing to cut at all. Here is a situation where a practical working knowledge of sandpaper and its relation to successful sanding machinery practice would have proved invaluable. For then the operator would have known that gummy wood not only demands a sharp paper but the very coarsest grit practical should be used.

Sanding machine operators, even old hands at the game, differ widely in their preference of certain types of grit. Some put their faith on flint paper while others condemn flint, as related to their proposition, arguing that garnet is the only paper to use. We cannot truthfully say that the argument either way is based wrongly for individual conditions are a powerful governing factor, and it is because the argument is based on individual conditions that some operators endorse flint paper while others would not consider using any paper but garnet. Often, too, operators will differ as to the grades best adapted to certain work. So in considering the data incorporated in this article it must be remembered that average sanding room conditions have been used as a basis.

For sanding soft wood other than of a very gummy nature flint paper works out well, as it has an exceptionally sharp cutting surface. However, on hardwood or very gummy wood it does not give as good service as garnet paper, because its sharp cutting surface rapidly wears away. Flint paper will not stand crowding, as is often necessary in getting out rush orders, and is therefore looked upon less favorably than garnet paper by a large number of sanding machinery users and operators.

Garnet paper, though while not so sharp to begin with as flint paper, holds a good cutting surface longer, especially where considerable of a cut is taken. And while, as I say, many sanding machine operators place their faith on flint paper, by far the majority prefer garnet paper and claim for it not only longer service but finer finish.

Belt sanding machines, whether of the more commonly used hand block type, or the more complicated power contact type, almost invariably demand a fine grade of grit. This grit may be mounted on a paper or a cloth body, and either will work out more or less satisfactorily, but the cloth body is less likely to break. As I have said in my previous articles the quality of finish obtained on a belt sander of the hand block type is largely determined by the ability of workmen. Consider the hand block machine, where the operator brings the cutting surface of the belt to bear against



The best joint for sand belts.

the stock to be sanded by using a hand block on the back side of the belt. Were a heavy grit used the slightest excess pressure of the operator would cause the belt to "dig" in. Even with a very fine grit the operator must be continuously watchful. On machines of this type where power contact is employed this difficulty is lessened, but a fine grade of paper is necessary here, too, or else the sanded surface will show scratches.

Care should be shown in making the joint in a sand belt because a bunglesome joint will leave its mark, every revolution, on the material being sanded. On this page a commonly used belt joint is shown which is most advantageous as the interlocking of the joint fingers gives the belt a "pulling" strength an ordinary lap joint would not have. Of course this joint requires some re-enforcing from beneath, but a light cloth will suffice.

On the multiple drum sanding machine the problem of "which" grit is best is one of greater importance than on the belt machines, because the drum machine sizes the material as well as polishes it. This calls for specific grades on each drum or cylinder. For the theory of the drum machine is that the first drum should remove the necessary cut, the second removes the scratches of the first and the third do nothing but polish.

Fir is a comparatively soft wood, but it is also very tough, and gives the average sanding machine operator more or less trouble. Unless the finish must be very fine, No. 2 on the first drum, No. 1 on the second and No. ½ on the third drum will work best. If the finish must be exceptionally fine, so that no hand sanding will be necessary, run stock through twice, using 3-2-1½ the first time through and 1-½-0 the second time through.

To give a very fine finish on crotch and birch mahogany, maple, Circassian and burl walnut, rosewood and other figured woods, whether used in solid or veneered stage, No. 00 or No. 000 should be used on the last drum, and never a coarser grade than No. 2 on the first drum. If surfacing is good, as it should be on this class of work, No. 1 grade on the first drum is best.

Soft woods such as white pine, bass wood, poplar, white wood, elm and butternut cut very easily on the sander. On these woods No. 00 garnet or possibly No. 0 will give a very fine finish, excepting butternut, which is an oily wood, and sands best with No. ½ grade for polishing. However, in sanding soft woods for cores for veneers, 3-2-2 is best, as these coarser grades of paper permit of faster rates of feed. A fine finish on such work is of course not necessary.

Georgia and North Carolina pine, cypress and other gummy woods should be sanded with a paper as coarse as possible to give the desired finish. On these woods a very fine paper quickly clogs up due to the gum. 2½-1½-1 or ½ gives a very good finish on these woods.

Oak is the most commonly used of all cabinet woods. It is a difficult wood to sand, too, on a poor machine, where the closest adjustments cannot be made and retained, as it has a very open grain, and in quarter-sawed oak there is a hard and soft grain as well as an open grain. Too fine a paper or a dull paper on the polishing drum will eat into the soft and leave the hard grain, resulting in a very poor finish. 1½-½-00 or No. 000 with very light pressure on the rolls will produce a finish that fairly shines if all adjustments are properly made. In sanding oak, cut across the grain as much as possible, and the hard figure is not nearly so likely to be raised. Don't try to feed too fast in sanding oak, as this will likely result in wavy marks on the sanded surface similar to knife marks on a planer. If your sanded oak shows such marks cut down your feed. If, however, the marks still continue to exist, look to other causes such as an out-of-balance drum, a loose drum bearing or play in the oscillators.

Now it must not be inferred that I have attempted, in the interests of good sanding, to lay down any hard and fast rule as to the grades of paper that should be used to sand various textures of wood. Other elements aside from the grades of paper that make for good sanding must be taken into consideration: the machine itself, its adjustment, the operator, his method of working and his ability to make the very necessary machine adjustments accurately, the condition of the wood to be sanded and the quality of finish desired.

As an example of the latter take for instance two door manufacturers in the same vicinity manufacturing both hardwood and softwood doors. One manufacturer demands a very fine finish on his product, and sands each side of his doors at least twice through, using very fine grit on the drums the last time through, say No. 0 or No. 00 on the last drum.

The other manufacturer makes his doors of practically the same kind of material, but caters to a different class of trade which considers price foremost. Consequently this second manufacturer values output before quality of finish, and sands each side of his doors but once through, with possibly No. ½ paper on the last drum.

And not only must we look at the proposition from that angle, but we must remember that the grades of sand paper as they are identified by their makers differ somewhat, a No. 1 grade of a certain make being as fine as No. ½ grade of another make. Sand paper itself is an exhaustive study and the sanding machine operator who wants to make a success of his work will find his time well repaid in finding out all he can about it.

In conclusion, a word of caution: Do not use the sanding machine as a surfacer. Don't remove any more stock than is necessary. Adjust the first drum to do all the cutting, the second to remove the scratches of the first and the third to do nothing but polish. Don't use dull paper for polishing, as it slights the hard spots, cutting into soft ones. And don't sand a lot of gummy stock, clog the paper and then try to sand hardwood. It can't be done. If there is a truck load of gummy stock to sand, do it last.

Laying Out Dado Work

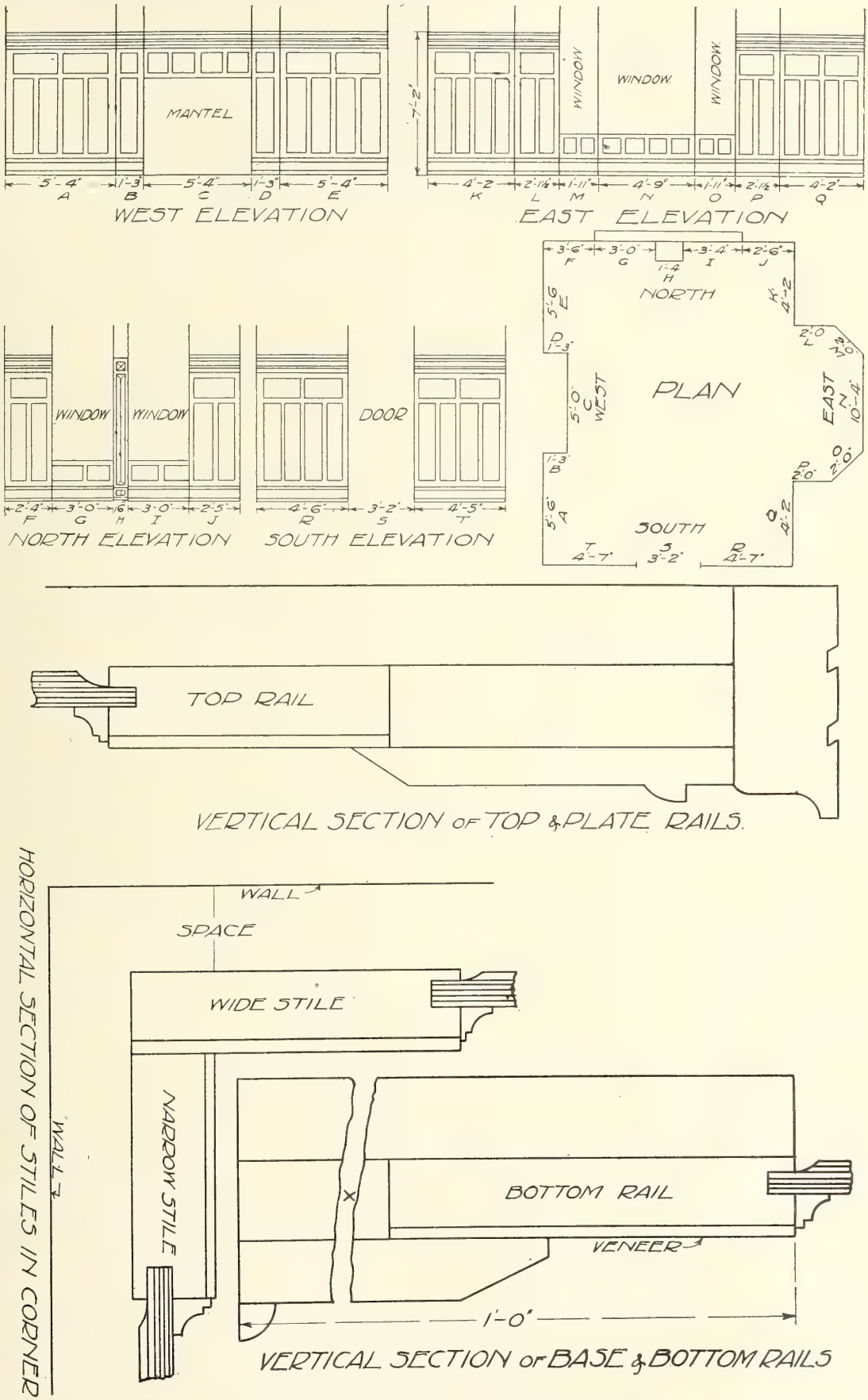
By R. M. Ginnis, Toronto.

(Submitted in Canadian Woodworker Essay Contest.)

TO lay out dado requires considerable thinking and measuring, as it has to fit exactly, otherwise it will be returned for alteration, which is not very pleasant for the man who laid it out. Therefore you need to be very careful when on this work. The first thing to do when laying out this work is to examine the sections. From this you will learn the full size of the rails, moulding and face. You will also see the thickness of the panel. It will show if it is against the wall or away from the wall. After carefully examining all this you will then proceed to lay out the dado. The first piece is (A) and is 5 ft. 6 in. from wall to wall, but as the dado is 1 in. away from the wall it will be 2 in. less. That is, 5 ft. 4 in. (All these measurements are taken from wall to wall). This piece will have a wide stile on both sides.

A good plan is to have two wide stiles on one piece when you can, and when you cannot, put the wide one on the right side. Of course, you are compelled sometimes to put the wide one on the left side. The next is (B), and is very narrow, as it is at the side of the mantel, and is 2 in. away from the wall as (A) runs up to within 1 in. from the wall. This piece, therefore, will run up to (A); at the other, it will run over 2 in., that is, 1 inch over the breast of the mantel, and one inch for a mitre to (C), so this piece will remain the given size, 1 ft. 3 in. The next is (C), and this is over the mantel. The size from corner to corner is 5 ft. One inch over the corners makes it 5 ft. 2 in., then you have to allow the thickness of a dado for a mitre on each side, as it mitres to (B) and (D), so this piece will be 5 ft. 4 in. wide. (D) is laid out the same as (B), and (E) the same as (A).

The next is (F) and (G). This is made in one piece, but (F) is the same height as the others, and (G) is made 2 ft. high, as it comes under the window sill. From the corner across to the window is 2 ft. 6 in., but as there is a wide stile on (E) this piece will only come up to (E), making it 2 in. short on



DETAILS OF DADO WORK

the left side. This piece will therefore measure 5 ft. 4 in. over all.

By referring to the elevation you will see that (H) is a pilaster; no piece is required. At (I) and (J) it will be laid out the same as (F) and (G), only it will be reversed and will have a wide stile on the right side, measuring one inch wider than (F) and (G), as it will run to within an inch from the wall. The width will be 5 ft. 5 in. (See north elevation).

(K), 4 ft. 2 in. wide, will be 2 in. to the left, as there is a wide stile to the right of (J), but it will go over on the right 2 in., so as to mitre to (L), therefore it will measure the given size, 4 ft. 2 in.

(L), 2 ft. wide, has to mitre to (K) and also to (M), but as this mitre is at an angle of 45 deg. on the face side, the stile on the right will have to be ½ in. wider, viz., 3½ in. When mitred it will show 3 in., the same as the others, therefore the size will be 2 ft. 1½ in. wide. At (M) (2 ft.) both these stiles will be 3½ in. wide. The size will be 1 ft. 11 in. At (N) both these stiles will be 3½ in. wide. The size will be 4 ft. 9 in. (O) will measure the same as (M)—1 ft. 11 in. wide. (P) will measure the same as (L), only the 3½ in. stile will be on the left and not on the right; (Q) 4 ft. 2 in. wide, will measure the same as (K), 4 ft. 2 in. wide. With regard to (R), 4 ft. 7 in., the wide stile is on the left and the narrow stile on the right. On the right it comes to the trim at the door and on the left it runs past (Q), making a width of 4 ft. 6 in. At (T) there are two narrow stiles. The stile on the left runs up to the trim and the one on the right runs up to (A), making a width of 4 ft. 5 in. (see full size drawing at (V) for the wide and narrow stile in corner at (T) and (A)). The letters on the elevations correspond with those on the plan, and the sizes on the elevations are what the dado will have to be made.

We will now explain what is meant by full-size sections. These are for what is drawn to scale. For example: the architect draws the elevation of a door upon which he wants a 5 in. stile, but he does not draw a full-size section of the stile. If he wants a little over the line on a ½-in. scale it would show 5½ in., and the door would be made with a 5½-in. stile, and not with a 5-in. stile, as was intended.

We now take the full-size section of the head, as at (V). This shows the plate rail; underneath is shown the piece that is above the top rail. This piece is of pine and cannot be seen, as it is covered with a moulding on the face. Then it shows the top rail of the dado with a veneer on one side and a panel. The panel is backed off on the back. The lines running down the panel indicate that it is to be built up to six pieces with a veneer of oak on the face. At (V) is shown the wide and narrow stiles in the corner, also the space from wall to dado. Section (W) shows the base and bottom rails. The bottom rail need not run down to the floor as the base rises to within 3 in. from top of rail, so that the stiles can run to the floor as is always the case. The broken lines at (X) indicate that no measurement is to go beyond this line. The size therefore is given on the side, that is, 1 ft, so that the lower part has to be dropped until it measures 1 ft. This will give the full size of the base. (Y) illustrates a quarter-section that is put all around the dado at the floor.

The best excelsior is made from basswood, or linden. Aspen and cottonwood, however, supply nearly half of the total amount manufactured.

Box Woods of Honduras

The pollack is a common softwood tree of British Honduras which grows on almost any soil except swamp and pine ridge. It is prolific and a quick grower, and can be economically felled at five years from seed for pulp purposes. When it once takes possession of clearings it quickly dominates all other vegetation. It grows from 15 to 20 ft. high and the largest trees are not more than 20 ins. in diameter, usually about 15 ins. It grows straight to the first branches, which spread slightly. The bark is of fibrous nature, with two layers, the outer being coarse and not so strong as the inner, which is softer and finer, somewhat like basswood.

The fruit is pear-shaped, from four to six ins. long and two to three ins. thick at greatest diameter. It has a hard shell of dark brown, changing to almost black when fully ripe, and contains a short staple brown fluff or silk fibre.

Mixed in each pod of the fluff are a number of small seeds, which are easily disposed of. They are carried by the silk in much the same manner as sycamore seeds are spread. The wood resembles that of the cottonwood of the United States. Insects appear to have an aversion to it, and trees felled for many weeks appear to be untouched by them. The cheesy taint complained of in some quarters in box shooks made from cottonwood seems to be absent from pollack wood.

Progress in Wood Bending

Wood bending is almost exclusively a hardwood proposition because it involves the use of hardwood all along the route from wheel rims and shafts to chair braces, and includes all of the used articles in bentwood. In the progress of this industry many machines and appliances have been invented to facilitate the work and to reduce the percentage of breaking. Until recently most of the attention has been centred on appliances for clamping and holding and bending the wood, but now there is a new line of progress through the development of enclosed retorts for steaming or preparing wood to be bent. While this is the most recent phase of progress in wood bending, it is really in many respects the most important because it is not only a source of economy in the use of steam for bending, but perhaps contributes more than any other one thing to reducing breakage and to insuring a smooth even bend. For many generations the practice has been to boil wood in open vats or steam it in home-made wooden boxes. This has wasted much heat and has never accomplished the results it should. The newest idea in this line is an enclosed retort in which wood for bending can be steamed under pressure. It is a good idea, too, offering advantages enough in steam economy to pay for itself, and it certainly improves the condition of wood to be bent. It is a good idea that should have been taken up long ago, and now that we have it it should receive the attention it merits from all those who have bending to do.—Hardwood Record.

The cross-cut filer in the woods may not study the science of filing like the man in the mills, but he nubs after the knack of making his saw eat wood and pull light in a way that usually delivers the goods.

The mill man who installs new shafting and pulleys should see that pulleys are placed near bearings. A pulley midway between bearings may be called on to pull a heavy load, and then the shaft springs.

Glass Work in Cabinet Making

By G. Melville Waters, Hamilton

(Submitted in Canadian Woodworker Essay Contest)

NOT infrequently it happens that a cabinet-maker in changing from one factory to another, or in taking an appointment with a firm manufacturing all kinds of special articles, gets work to which he has not been accustomed—possibly work which he has never done before. A man who has spent several years in making furniture, and then goes to a factory which specializes in interior work such as fixtures for banks, hotels and stores, will find a great difference. Generally he will require a tip or two from his shop-mates and sometimes instruction by the foreman.

As a rule any intelligent man can manage the woodwork part of a job, but the glass work is another matter, and a few pointers may be found of some value. Suppose, for instance, the job is a bar fixture. Often many large mirrors are placed at the back of the sideboard and these require careful handling. If the glass is procured in the same place as where the job is erected, the first handling is greatly facilitated, as in all probability it will not be packed up. In a great many cases, however, the glass is obtained from a distance, and when it is unpacked the trouble begins, if care is not exercised.

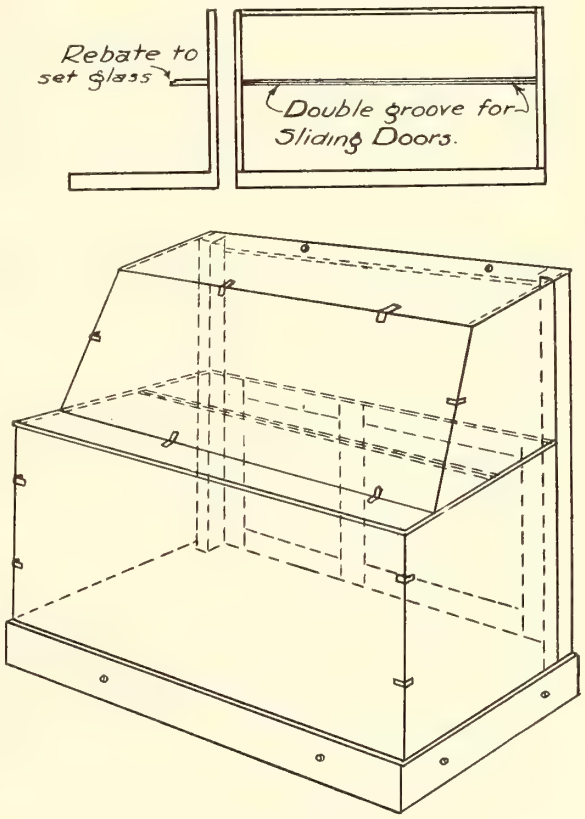
Now in handling a box of any size, before removing the lid tilt the box back against the wall and put a wedge underneath it to keep it in position. Make sure that the top of the box is at the top, for if the consignment is from a long distance, and especially if it comes by boat, the box is sometimes delivered upside down. If you do not see that the box is right side up it is more than likely that you will hear some slipping and breaking noises when you ease off the lid and the straw. This applies particularly when glass of various sizes is packed in the box. When lifting out the glass do not stand it on the floor to change your position. Get a couple of sticks beforehand and place them crosswise on the floor. Then you can place the edge of the glass on with safety.

If the glass is held in position with beads, do not drive in your screws or nails on the slant; drive them in parallel with the glass. If you drive them in on the slant it will probably pinch the beads too tight and the result will be a beautiful curved crack across from the tight place.

If you are putting in double diamonds, put the hollow side into your job and the moulding or beads on the round side. Do not put in the material too tightly. If you put it in so that it will just rattle when it is tapped with the figures it will stand a lot of knocking about when in use.

Showcases made almost entirely of glass are fast taking the place of the older type on which a great deal of wood was used. The ever-fastidious public demand something which gives them a good display with as little inconvenience as possible. The reader will notice by the sketch that practically no wood is seen when the all-glass case is erected. This makes it easy to see everything in the case—but this is not my point: it is the making of this case which interests the cabinet-maker. Before starting to put the job together one should see that every piece is exactly the size shown on the drawing. He must also see that the various parts are square are perfectly straight. Then he can make the job with the greatest exactness. When putting in the glass, which is fastened together with glass clamps, strips of baize should be pasted along the edges wherever the glass comes into contact with another piece. When the clamps are fixed on, care should be taken to see that the screws are firm, but not too tight. When screwing pieces of glass on to wood, as in the case of the top, see that the screw is placed in the centre of the hole. If it touches the edges of the glass it will probably chip out. When putting on the base—which by the way is marble—do not force it tightly against the glass. This is generally obviated if you put on the beads holding the glass inside after the base.

Sometimes it happens that the glass arrives a little wrong in size and then the trouble begins, but if care is taken to make the woodwork a perfect size the workman will find himself on the safe side. There are many shapes and sizes of these showcases, but the same rules apply to all.



An all-glass show case.

Good machinery is not more essential to the success of a manufacturing enterprise than is a thoroughly modern office and factory system. Every machine in the plant may be of the latest and most expensive type, but if the system upon which the business is conducted is antiquated and inefficient, the organization is behind the leaders and in a fair way to meet with disaster.

It is noticeable that the man who gets individual motor drive seldom wants to change, but even the ardent advocates of electric drive seldom advise the provision of individual motors for all machines. Groups of light machines can be driven from one motor, and the investment in motors reduced without any great inconvenience and without impairing the efficiency of the driving system.

QUESTION BOX

A Practical Department of Reference for the Practical Man

Imports of Baseball Bats

Q.—"In the March issue of The Canadian Woodworker you gave a tabulated statement of wood imports into Canada from the United States. There is a large business done in this country by United States manufacturers of baseball bats, but your statement does not give the details. Can you furnish them?"—G. A. Turner (Drayton Mills) Drayton, Ont.

A.—We submitted your inquiry to Mr. R. Grigg, the Commissioner of Commerce at Ottawa, but he tells us that in the Governmental returns baseball bats are included under "All other woods and manufactures thereof." It follows that the business is really not large. Mr. Grigg sends us a copy of the Report of the Departmental Commission on Statistics. He directs our attention to a statement that the Customs classification is designed entirely for revenue purposes, and is the basis of Canadian statistics. This is the official explanation of the inability of the Department of Trade and Commerce to give you the details that you require. We are instituting further inquiries with a view to giving full information in our next issue.

Selecting Greases and Oils

Q.—"We have had submitted to us for trial several different kinds of grease at widely different prices, each of which is claimed to be equal to or superior to the others. Can you give us any information which will guide us in eliminating the altogether undesirable ones, and selecting the best value for the money."

A.—Greases and oils present one of the greatest problems the buyer has to solve, and, at the very best, there is little except experience and common sense to guide him. It is well known that an oil salesman is never stuck; he always sooner or later meets a competitor's price, and you may be sure that very little money is lost by him in so doing. In other words, the wide variety of oils and fats at all kinds of prices, not to mention fillers and perfumes of various kinds, enable him to give his customers just about what they are willing to pay for. Chemical analysis and physical tests enable the worst frauds to be exposed, but unfortusately such tests are not infallible, and at the best are poor guides to the lubricating quality. There are two or three broad rules which can be followed, however, by which good results can be obtained, but they are not fool proof, and have many exceptions.

(1) Acids corrode or pit steel, therefore do not buy oil or grease which will tarnish bright polished steel.

(2) Oils or greases with pronounced odors are made in part or wholly from animal fats, and without the addition of some perfume would be unbearable. Furthermore, animal fats decompose, and during decomposition set free certain complex acids which in time will ruin any bearing.

(3) Oils and greases manufactured from asphaltum crude oil should not be used in gear cases or in long oil passages, as there is sometimes a thin film of asphalt deposited on the inner surfaces, which will flake off and clog the oil passages.

(4) Stick to petroleum oils and greases. Do not try to force prices too low, but if you want to economize, get after the men who use the oil rather than the one who sells it.

To Keep a Circular Resaw from Heating

Q.—"Do you know how to keep a circular resaw from heating? I have one that persists in heating—that is, the collar heats. I have tried everything I know, but without avail. It works well in 1-in. stock, but in feeding 2-in., unless an interval of about a minute is allowed to elapse between sticks, the collar will smoke."—Fred Turnbull (Manager The Silver Creek Lumber Company), Bituma, Alta.

A.—It is rather hard to say, without seeing the machine in operation, what causes the collars to heat, but it might be caused by the splitter being too narrow and allowing the lumber to draw against the collar. It is possible that the friction of the lumber against the collar would cause the collar to heat. This splitter should be a little thicker than the saw and collar combined, and set so that the lumber would not strike the saw or collar on either side. The splitter should also be a little thicker at the bottom—that is, near the table of the saw—tapered slightly towards the top.

We have never head of a circumstance of this kind; we have heard of saws heating up, but never a case where the collars heated (in fact the machine referred to must be an old machine, as we understand the machines built nowadays are not equipped with wide collars, and the saws are made of heavy gauge in the centre and tapered towards the teeth.

We would suggest that you examine the splitter carefully and see that it is set in line with the saw, and that it is as thick as the saw and collar combined. If we are correct in our contention that you are using a wide collar, and if the suggestion we have made does not remedy the trouble, we would make a further suggestion that you dispense with the wide collar altogether and get a saw as named above, that is, with thick gauge in the centre tapered towards the teeth.

Substituting Canvas Belts for Leather

Q.—"The increasing cost of leather seems to be affecting the value of leather belting to such an extent that we shall be obliged to use some substitute. Of the many types on the market, which are best fitted for use in the lumber mill, and where do they give the best service?"

A.—Even taking into account the increasing cost of leather belting, it is doubtful if there is at the present time anything on the market which can touch it in the long run, provided it gets good attention at stated intervals, which is to see that it is not allowed to run too tight; is not allowed to slip; is kept clean;

shafting is in line; pulleys free from nails and properly faced, etc. The use of canvas belts, either plain, stitched, or coated with balata or rubber is entirely feasible, however, provided a proper size of belt is selected for each job. Makers of canvas belts generally recommend a belt of the same width as the leather belt it replaces, compensating for the difference in material by using different thicknesses or plies, and even though the traction power of the canvas belt is lower than leather, it can be made to hold on to a certain extent by making the belt heavier and running it tighter. This, however, imposes an extra strain on the shafting and bearings and the belt being stiffer, requires more power, so that the gain is of a doubtful quantity after all. If on the other hand, it is determined that a canvas belt is to be used, one an inch or so wider and not so heavy will give the same tractive effort as the leather, and will not cost anywhere near as much. This may mean that it will be necessary to substitute wider pulleys, but every factory has a widely divergent lot of pulleys running on their shafting, some being a lot wider than necessary, and a little calculation will sometimes effect the necessary changes without much expenditure. Do not try to run canvas belts of any kind with a shifter, and if they are required to run over tighteners, have the surface dressing which is generally applied to one side of the belt for appearance only, omitted. Never punch holes for lace wire, and always use a hinge fastener, preferably one using the coil lacing of the Jackson type, as this is sewn and pressed deep into the fabric and cannot tear out. We would be glad to give further information regarding lacing of these belts to anyone who is interested enough to write.

Fluting Columns on the Shaper

Q.—"I should be glad if one of your readers would tell me the best means of fluting verandah columns with the shaper."

A.—To flute columns on the shaper requires a form in which to hold the column while the cut is being made. This form, of course, is made with an adjustable centre at one end, so that various lengths of columns can be worked with one form. Essentially the form is patterned after a turning lathe, with two centres to hold the ends of the column, mounted on a base which slides on the shaper table. This base is preferably made of some hardwood that will not be subject to any great amount of warping. For this base a 1 in. x 6 in. board long enough to allow two feet for the end centres over the longest column to be worked is necessary. A slot is worked up the centre of the base on the dado machine and countersunk, or made wider on the underside, as shown in the section, to receive the head of the clamping bolt of the movable centre. This movable centre is made with a base block through which the clamping bolt is put, and a vertical piece with a metal nut inserted in it. Through this nut the centering screw is threaded. The whole frame is stiffened with corner blocks, as shown in Fig. 1. The fixed centre is attached directly to the base of the form and requires no base block. The vertical block is stiffened with corner blocks in the same manner as the movable centre. On the fixed centre is mounted a wooden or metal disc with concentric rows of holes bored in it to make what is called a dividing plate for locating the flutes at equal distances for various sizes of columns. A large column will have more flutes than a small one, and consequently several rows of holes are bored in the disc, each having a different number of holes, according to the number of flutes likely to be used in the ordinary run of work. Sometimes a wooden disc is the foundation, but is covered with a metal disc, so that the holes do not get worn out by the pin stop. In addition to the centre points, two or three extra spikes are put in the face of the disc to ensure that the column and disc will move together. The centre point may be an extension of the bolt carrying the disc.

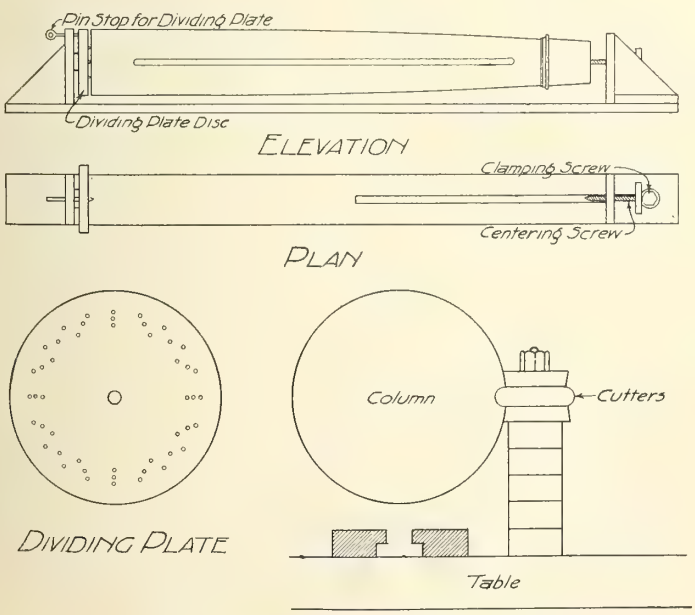


Fig. 1.—Details of form for fluting columns.

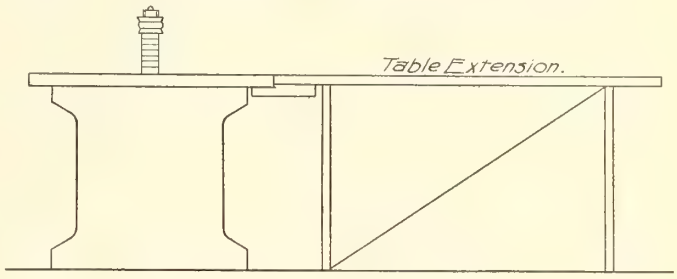


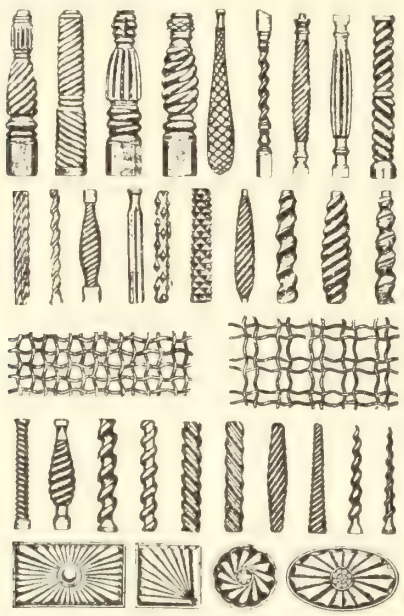
Fig. 2.—Extension to carry end of form.

When using a form of this description, it may be necessary to use wooden extensions on the shaper table to carry the overhanging ends of the form. As the weight is all carried at the ends of the form, they would sag when the cutter was near the other end of the column. Fig. 2 indicates roughly how an extension may be adapted to the table, so that when not in use the legs may be folded up by the use of hinges. Where the floor is good enough, points should be inserted in the legs to fit into holes in the floor, so that there is no time lost in fixing the extension. A diagonal stay will make for greater rigidity when in use. As the column itself runs directly against the shaper collars, it may be necessary to cut away the form a little where the narrow end of the column comes, so as to afford clearance for the lower part of the shaper spindle. To avoid grooving the surface of the column, the shaper collars should be tapered, as in the sectional sketch. Of course, it is necessary to raise the shaper spindle high out of the table. In our own experience, the table was provided with a long extension spindle to screw into the main spindle for this work, as ordinarily, the spindle used would not reach high enough. Care must be taken to see

that the cutters are exactly level with the centre, and that the end centres of the form are both at an equal distance from the table of the machine. The terminating point of the flutes is marked when the column is in the lathe, and we have found that it is a good plan with work of this kind to feed in the same direction as the cutters are working. There is no danger in this, since the cutters are small and the weight of the column is usually considerable. Owing to the length of the spindle, it is necessary to take a little extra care in balancing the cutters, as the slightest variation in the balance will create considerable vibration in the cutter spindle, on account of the distance of the cutters from the nearest bearing.

Making Stopped Spiral Beads on Turned Work

Q.—"I was interested in the description of the fluting and twist machine illustrated on page 38 of the March issue of The Canadian Woodworker, but there is one point on which I should like information. The piece of work illustrated in the top right-hand corner of the cut showing the samples of work done on this



Patterns of spiral and fluting work.

machine shows spiral beads stopped at a plain bead in the centre of the piece of work. Can these beads be cut right up to the centre bead on the machine, or is hand work necessary?"

A.—For convenient reference we reproduce the cut herewith. The spiral beads on the piece of work shown in the top right-hand corner of the cut cannot be finished right up to the centre bead on the machine. Since the cutter is rotating in a circle it must necessarily make a curved end to the cut, so the grooves have to be finished up to the bead by hand with a chisel. This only takes a couple of minutes. The best way is to turn the bead on the lathe and let the cutters run up close to it and finish the spiral by hand.

Practice has disproved the predictions that band saws would not successfully saw yellow pine logs because of the resinous gums they contain. Predicting what machinery will not do is about as certain and satisfactory as predicting what the weather will be.

The Hardwood Market

"A month that compares more favorably with January and February than March, 1914, did with the first two months of that year."—Thus is the hardwood trade for March, 1915, summed up, and this statement may be taken as part of the ground for the general optimism prevailing in the market—an optimism that has outgrown much of the "Safety First" aspect which characterized it in the case of buyers last month. This change follows as a natural result of the strong position in which the dealers placed themselves by their winter policy. They have been quick to recognize the improvement in the situation, and the larger buyers who have kept as closely in touch with the march of events as the dealers are now seeing the prices prepare to take up a better level all round. The indications of an increasing demand have also been recognized by the buyers, and they have shown their knowledge of this condition by increasing stocks. This increase is not so great as many of us would like to see it, but it should surely give some satisfaction to know that the indications of last month have commenced to materialize.

The building trade in hardwoods is rather ahead of the factory trade in its recovery, but factory stocks to some extent are anticipating their own share of trade improvement. While no woods are conspicuous by their activity, we have not noticed any that may be classed as particularly dull, and this fact, coupled with that of the fulfilment of last month's indications, is a pretty fair pointer on the line that is being taken up by the hardwood market. All things are working together to give prices a better level, and it now remains to be seen whether stock will be moved at the higher level. We think it will, and should it do so next month's reports should not be far behind those for the same month of last year.

Southern Hardwood and Veneer Market

(Special to The Canadian Woodworker)

Louisville, Ky., April 10.—The war tax on lumber which has been imposed on stock moving into Canada has been the subject of much discussion on this side of the line, and general regret has been shown that the Canadian authorities saw fit to impose such a heavy burden, which has necessarily fallen on the consumer.

The amount of the tax, 7½ per cent., is regarded as almost prohibitive, and it is feared that many consumers will refuse to buy for the present because of the greatly increased cost of lumber which the tax has brought about. United States manufacturers have arranged in all cases to have the consignee pay the tax, so that it is falling on the manufacturer in Canada who is using the material.

It is possible that some of the consumers in the Dominion will be able to get hardwood lumber for less than the usual prices plus the tax, for a number of United States lumber concerns arranged prior to the effective date of the tax for the shipment of a considerable quantity of stock to Canada, so that it was available for a time for shipment without tax payment. The shipper has had the option, of course, of using this advantage to boost sales, or holding the price up

to the point where it has been forced by the increased cost due to the war tax.

Whether or not the tax is effective as a revenue-producing measure, lumbermen in this section hope that it will not long remain in effect, and that the conditions which have made it necessary to impose this barrier between the business men of the two countries will be eliminated and so make it possible to restore normal conditions such as will encourage the free movement of all commodities.

The general hardwood market has been showing improvement during the past month. The movement of stock has been considerably larger than heretofore, and though prices have not advanced materially, sentiment on the part of both buyers and sellers has been more optimistic, so that conditions seem to be favorable for advances in quotations. This will come about in the natural course of events with the larger movement of lumber, however, inasmuch as the law of supply and demand is still operating, and the supply is not so great that it will be able to take care of unlimited demands.

As already pointed out in this correspondence, there is a scarcity now of certain items, principally thick stock, which has been in demand for war purposes, and in fact everything except the staples, like four-quarter No. 1 common, has been a little more difficult to locate. This is not to say that stocks are smaller than the requirements of consumers, but only that due to the cessation of operations by most of the leading producers, those items which are not generally manufactured are becoming harder to locate, and the consumer must therefore expect to pay more for them, even though he continues to get the staple thicknesses and grades at not much advance in price.

One of the most encouraging features of the situation is the improved tone of the market in railroad supplies. The carriers have been granted advances by the Interstate Commerce Commission, and they are now buying more freely. This is true of lines both in the east and west. The absence of railroad buying, coupled with the loss of export trade for the time, was what knocked the hardwood market into the proverbial cocked hat early last fall. The export trade has been coming back, piecemeal, since then, and war business on hardwoods is now at its height.

The extent of building operations is still more or less problematical, and must await developments. Labor conditions ought to be more favorable in the big centres than they have been, for those who have been eating half loaves will probably not care to jeopardize their living by insistence on high wages, in the face of unfavorable business conditions. The furniture trade has been a disappointment thus far. The spring trade has not yet manifested itself, and except in those sections where agricultural interests are chief, and where consequently the prosperous condition of the farmers has resulted in brisk sales of furniture at retail, the demand has not been nearly what had been hoped for. But after a rather mediocre show season, the manufacturers were prepared for this.

The mahogany situation is active, due not so much to increased demand as to the prospect of a log shortage. This is likely to have a favorable effect later on such woods as American walnut and quartered oak, which are already profiting by the high price of Circassian walnut. Mahogany prices have been advancing steadily, and this upward movement, which seems to be thoroughly justified by conditions, is stimulating buying somewhat.

News of the Trade

Herbert Moisley is building a planing mill at Thorold, Ont.

J. W. Barnes has succeeded the Assiniboia Planing Mills at Assiniboia, Sask.

W. McDougal has bought the planing mill formerly operated by W. G. Hopkins, at Melfort, Sask.

Good progress is being made in the erection of the sash and door factory at Montreal for Messrs. Lebel & Tergues Company, Limited.

Buckman Brothers, of Drayton, Ont., contemplate the construction of a new wing to their basket and box factory at an estimated cost of $8,000.

From St. John, N.B., comes a report that Messrs. Haley & Son, manufacturers, have purchased a site for the erection of a woodworking plant in that city.

We hear that the Kemp Furniture Company, of Amherstburg, Ont., are planning a two-storey addition to their factory at an estimated cost of $3,000.

The extension of the plant of the Port Dover Planing Mills, Port Dover, Ont., is intended to provide space for the manufacture of the cheaper classes of furniture.

The Dundas Fruit Package Company, Dundas, Ont., contemplate the installation of a rotary veneer peeler and a veneer clipper for the manufacture of basket material.

A sash and door factory, estimated to cost $5,000, is to be erected shortly at Summerside, P.E.I., for M. T. Schurman and Company. The work will be started on May 1.

Canada Machinery Corporation, Limited, Galt, Ont., manufacturers of woodworking machinery, have increased the capital stock of the company from $1,500,000 to $2,000,000.

At Beebe, Que., a sash and door factory is to be built by Mr. Walter Brown, of Beebe Junction, at a cost of $5,000. The new plant will take the place of the factory destroyed by fire recently.

Mr. John G. McBeath, for many years manager of the Woodstock, Ont., branch of the Canada Furniture Manufacturers, Limited, is retiring. Mr. McBeath was Mayor of Woodstock in 1913.

With a capital of $100,000 The British Columbia Shingle Company, Limited, Vancouver, B.C., has been incorporated. The new company will carry on business as sash and door, lumber and shingle manufacturers.

Mr. G. W. Gaden, manager of the Gaden-Hillock Revolving Door Company of Canada, died on March 31, at his home in Toronto. The deceased was born 73 years ago in St. John's, Newfoundland, and was a pioneer of revolving doors in Canada.

The Meades Upholstering Company, Limited, has been incorporated by W. Meades, G. A. Rozel, A. B. Taylor, R. Brunt, J. Jagelewski and J. Mills, all of Hanover, Ont., to acquire and operate the furniture manufacturing business formerly carried on at Hanover by Walter Meades. The capital stock is $50,000.

B. O. Knechtel, J. Knechtel, O. Knechtel and S. Knechtel have incorporated Knechtel Brothers, Limited, at Southampton, Ont., to take over and carry on the manufacturing business hitherto operated by Solomon Knechtel under the registered name of "The S. Knechtel Wood-Turning Company." The capital stock of the new company is $50,000.

Further Remarks on the Fuming of Oak Furniture

Contributed by W. J. Beattie, Owen Sound

In an article "Fuming Oak Furniture," published in the March issue of this journal, I promised to give the results of some experiments as to the effects of time and other conditions on the finish of fumed articles.

If a fairly light fumed color is required, it can be obtained by the use of the ammonia alone. When taken from the chamber the goods have a light yellowish brown color, which darkens preceptibly when the shellac is applied. Using a toning color of nigrosine and methylated spirit, or one of a brown color soluble in spirits, applied with a soft camel hair brush on the lighter portions, will produce the effect required.

The strength of the above color solutions can be determined by trials, and the exact quantities weighed, so as to be accurate for future uses. The effect of the ammonia fumes in the chamber produces a greater depth of color, though the depth that they penetrate does not materially differ in a fuming of four hours as against one of ten or twelve hours.

I have experimented with small pieces of oak 5 in. by 3 in. by ¼ in. thick and find about the same penetration in either case. For a chamber 10 ft. by 12 ft. by 8 ft. it will be found that two quarts of liquid ammonia properly evaporated in the chamber will do the necessary work, but would advise keeping the room closed for six hours or longer. Leaving them in all night is the better plan.

Staining the goods previous to placing in the chamber, is, I believe, better than staining after removing them. A fume stain that I can recommend is the No. 46 made by the Grand Rapids Wood Finishing Company. The Marietta Paint & Color Company also make a good fume stain. There are no doubt other good makers, but I know that the above are satisfactory. The stains can be used full strength or diluted with water, depending on the color desired.

Whether the stain is applied before or after the fuming, go over the sap streaks with a chemical that is sold by the above firms for that purpose, and also give a liberal coat of a mixture of tannic acid, fumine and water; 1 oz. of tannic acid and 2½ oz. of W. K. Schmidt's fumine to a gallon of water. Mix this warm and apply liberally with a brush, let dry, and place in the fuming chamber with the grain raised; this helps the penetration of the fumes. When removed from the chamber sand smooth and apply the stain of the necessary strength to produce the color required.

The mineral wax in liquid form, which is applied last, is made by the Ronuk Company, Limited, of Toronto, and the Grand Rapids Wood Finishing Company. This is applied with a brush and is allowed to remain until the moisture is nearly evaporated and then wiped off with a soft wiper. It will not fingermark and gives the final touch to a good job.

There is plenty of room for the finisher to exercise his ingenuity in turning out good fumed work, as oak is of so many shades and textures that it is quite an art to get a fairly uniform shade on the larger surfaces, such as table-tops. Oak lumber is expensive, and is not allowable, except on very high grade goods, so it is up to the finisher to do his best and not growl because he has to coax them into subjection.

When the larger surfaces are veneered his troubles in that line are almost eliminated, and as the veneer is all from the same flitch the "temper" is even, and the color of the finished article is harmonious.

The fuming of plain oak is even more trying than the same article in quartered oak. Some people express a preference for the plain oak, and unless the quarter sawed lumber is of the smaller grain effect, it is not greatly to be preferred to plain oak. The big splashy figure that used to be looked for some time ago is not desired, even in the golden oak color. People's tastes are becoming more refined in the buying of furniture, as well as in other things.

If any readers are contemplating the building of a fuming chamber the writer will be pleased to give them what assistance he can if they will address him in care of The Canadian Woodworker and Furniture Manufacturer.

Don'ts for Varnishers

Don't use a different varnish for each coat when building up a foundation. The character of the different varnishes will assert themselves and the results may be fatal to good work.

Don't use a "dull," "flat" or "dead" varnish as a substitute for producing with water or oil and pumicestone a dull satin or china gloss finish on a properly prepared varnish surface. It will prove a disfigurement.

Don't forget that about 60 per cent. of the so-called "dull," "flat" or "dead" varnishes contain wax, over which at no future time will another varnish adhere, or amalgamate to its surface for any length of time, by reason of the nature and action of the wax.

Don't forget that by nature varnish is of a susceptible disposition, and that you must conform yourself to its requirements by surrounding it with favourable conditions during its application and drying period, otherwise you will be in a large measure responsible for its failure.

Don't neglect the necessity and advantage of having a personal acquaintanceship with your varnishes—know them intimately, their disposition and purpose. Let it be as if there were existing a bond of friendship, and by that token you will not readily agree to be separated. "By their works, ye shall know them."

Don't be "at sea" in this very important matter of varnishes and their proper use and ability to perform that which is required of them. Take into your confidence a varnish manufacturer of integrity and having a good reputation for his goods. Tell him just what you want; he will gladly confer with you to your profit.

The First Aid Column

A department within a department to which Foreman Finishers and others are invited to turn for a solution of the practical problems encountered in their work. Readers are particularly requested to give the trade the benefit of their experience from time to time by replying to the questions asked. A number of new queries are to hand this month. They are given below. Be a live wire. Let us hear from you.

Filling Weather Checks

Is there any method of preparing lumber that has been checked by exposure to the weather, so that a good finish can be applied? The ordinary paste filler seems to sink in, and we should be glad to know if there is any other material we could use to fill these cracks properly.—**Bryan Top Company.**

* * *

Testing Varnishes

Can any readers tell us by what means it is possible to determine the durability and general usefulness of different kinds of varnishes. We have not been getting the results we have aimed at, and we should appreciate any information which would enable us to form a dependable opinion of a varnish before using it.—**Evans & Company.**

* * *

Wanted—A Stain For Fir

Can I secure a description of a good stain for fir through the medium of the First Aid Column? The work I have to finish is the interior trim of a house and also some of the inside doors. I wish to get really good results, and shall hope to receive useful information from other readers of the Canadian Woodworker.—"**Mill Finisher.**"

Finishing American Walnut

Answering A. W. Henry's query on the dull finishing of American walnut, published in the last issue of The Canadian Woodworker, I would suggest the following: Being an open-grained wood, walnut must be filled, preferably with a paste filler. After this has been allowed to stand until quite hard, apply shellac, made very thin, with not more than five ounces of gum to each quart of spirit, sand down the shellac with fine paper, and give three coats of quick drying oil. When the last coat of oil is dry, sand lightly, and wax finish the whole surface. The finished effect may be varied by thinning the wax with turpentine and wiping off.—**W. W. Palmer, Brandon, Man.**

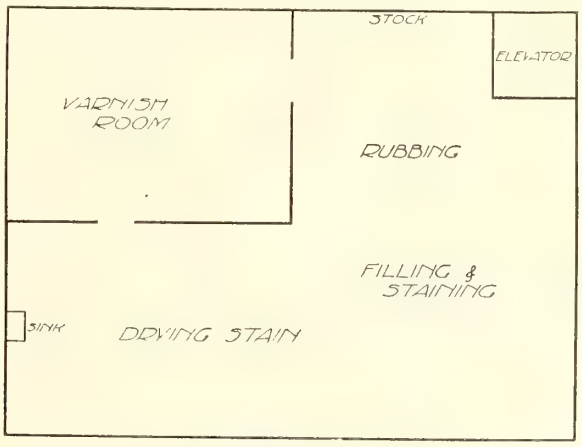
Humidity in the Finishing Room

What "A Finishing Foreman"—writing in the First Aid Column last month—has heard about the necessity for humidity in the finishing room is quite right, and I will endeavor to indicate means by which it may be kept up. The use of shallow pans of water is as simple a method as any. The evaporating surface is made as large as possible, and the pans should be located in the hottest parts of the room, so that evaporation may be free. The admission of steam from the heating system into the atmosphere of the finishing room may form another method of supplying moisture, but it is one that may have disadvantages in particular instances. The amount of moisture in the air can be measured by means of a hygrometer—an instrument which indicates in degrees from 0 to 100. 0 indicates an atmosphere absolutely devoid of any moisture, while 100 represents the saturation point. The required degree for the finishing room may be anywhere from sixty to eighty, according to the work being done. When the best degree has been found, it may be kept by regulating the evaporation until the hygrometer readings remain steady at the point desired.—**B. A. Lake, Montreal.**

Arrangement of Finishing Room

Probably no question in last month's First Aid Column opens up a wider field of discussion than that of the Larcombe Cabinet Company regarding the laying out of a finishing room. The query illustrates the present-day necessity of planning even the finishing room before starting work. It has been customary to plan the machine and bench rooms beforehand, but formerly it has often happened that a room has been set apart as a finishing room, and the men and material have been turned into it and allowed to work out their own finishing problems. Naturally results have not been as gratifying as they might have been. In many cases they have been far short of this.

The question seems to imply that the work to be done is mostly small stuff, but the quantity to be done is not indicated. Assuming that there will be enough



Suggested plan for finishing room.

work to keep the shop comfortably filled, we would suggest an arrangement somewhat like that which we have laid out in the sketch. We have assumed an elevator or a stairway at one corner, and this would form the starting point of what should be an uninterrupted cycle of operations. It would not matter in which corner the elevator was located—it is just a matter of getting a starting point and working either left or right so that the last operation takes place somewhere near the elevator. The floor should be of good hard maple, closely laid and kept clean. No heaps of shellac or varnish droppings should be allowed to accumulate. On account of the inflammable nature of most of the materials used in the finishing room, the matter of keeping the floors clean is an important one, and all fire precautions should be good. No wiping waste should remain in the room over night: it should be taken right away every evening before quitting. The heating may be of the ordinary wall coil type, but special attention will be necessary in providing for extra heat required in the varnishing room. As the drying of the varnish depends on evaporation, air circulation should be free. The extra heating for the varnish

room may be provided by this extra air by heating the air before it enters the room. The means of doing this will depend, of course, on the amount of capital available and local conditions. Ventilation should be easy since the finishing room is located on the top floor, and roof ventilators can be provided. The light should be good, and here again is the advantage of being able to put in roof lights, if required. The plan indicates roughly the parts of the room allotted to the various operations and shows how everything may be routed in a circle.

With regard to the stock of materials required, we would suggest that with a room of this size in full operation, spirit and oil should be stocked in barrels, while turpentine, benzine and varnish could be kept in five or ten-gallon drums, unless several kinds of varnish are to be used, in which case it might be better to stock one-gallon cans. All ths stock could conveniently be kept against the wall between the elevator and the varnish room. Two doors are provided to the varnish room, so that stock may go in at one door and leave by the other. A wash sink with a good supply of hot water, or means for heating the water, should be located in one corner, as shown in the sketch. Drying racks may be provided in the varnish room if the character of the work will make their use of any assistance.

Fuming Oak Wood

(a) What is the best method of uniforming wood for fuming purposes? In fuming wood in a fume box, we find that some oak takes lighter and some darker. Can you suggest a method which will aid us in securing a uniform fume without having to do so much shading?

(b) What treatment is recommended to secure the richest color after the wood is out of the fume box?—**Peppler Brothers, Limited, Hanover, Ont.**

Answer by A. E. Ayers, of Burroughes & Watts, Limited (billiard table manufacturers), Toronto

(a) If 880 overproof liquid ammonia is used and the pieces are allowed to remain in the fuming box thirty hours they should require very little shading, providing the lumber has been selected before fuming. It is well to have a window in the fuming room, so that the action of the ammonia fumes may be watched. For a room six feet square, half a pint of ammonia in three compartments should be used.

(b) Apply first a coat of thin white shellac and follow with a second coat consisting of equal quantities by measure of white shellac and wood alcohol. Rub down with No. 0 paper and finish with beeswax used sparingly with plenty of "elbow grease."

Answer by Albert Hudson, Hespeler, Ont.

(a) A careful investigation of the woods is necessary, as some kinds of wood darken more readily than others. In case a mixture of wood is found in any piece being fumed, such parts as darken quickest must be coated with paraffin wax or beeswax dissolved in turpentine when they are dark enough, and the piece of wood replaced in the fume box to bring the other parts to the required shade. A good deal of difficulty can be overcome by the use of tannin or pyrogallic acid in conjunction with variations in the length of time the work remains in the fume box. By increasing the acid, the length of the fuming process is correspondingly decreased. The workman applying a solution of these acids would not apply so much to sap wood, or discolored wood, so that the article when passed on to the fuming box presents a surface with a comparatively uniform amount of tannin to the fumes of the ammonia.

(b) Good fumed oak should not be filled. Although the pores have a brownish color darker than the general finish, they should be left open. Apply a coat of white shellac, thinned to about one-half the usual consistency, then sand smooth and apply another coat of shellac. Tone with a spirit mixture to an even shade were needed, then wax with a mineral wax. Allow this to remain for a sufficient time, then wipe off. In places where a coat of shellac has been given and the wax has entered the pores, it is often found that the wax dries out, causing it to show a greyish cast. This is sometimes more noticeable when the article is looked at sideways. To overcome this, some finishers have colored the wax by mixing a little Vandyke brown with it. Although this helps considerably, especially as far as the pores are concerned, it often gives a shade of brown that is superficial and not at all reliable, and gives one the impression that a little filler has been used on the stain. Good fumed oak should not be filled in any case. The best way is to oil the work and give a coat of shellac when the oil has well dried out, and then wax. For the very best work, fumed oak should be finished by a process akin to that of French polishing. The grain, however, must be left open and not filled up as is done in real French polishing.

Answer by R. Ferguson, Toronto

(a) There is no method used to my knowledge for uniforming wood before fuming. The trouble lies in using too many kinds of oak, as oak from certain districts will not take the ammonia fumes so easily as others do. I always use a weak solution of ammonia on the parts that have not become dark enough, repeating this operation until the shade suits.

(b) To my mind, furniture polishing after fuming always gives the best results and brings out the richness of the wood. Apply a thin rubber of ordinary polish to the work and dull down with powdered pumice stone and a stiff brush. Wax polishing is preferred by some after fuming, but I think that for furniture in daily use this finish is too easily marked.

A Machine Man's Viewpoint

By J. W. Smith, Berlin, Ont.

Being in charge of a machine room and cutting out department, I cannot attempt to answer your inquiry from the standpont of a finisher, but I am convinced that to get good results in fumed oak it is necessary to start at the cutting out end. There are a great number of varieties of quartered oak. For a fumed oak job we sort our lumber so as to get wood of the same nature, even in color and figure. Sapwood should be rigidly excluded, and it may be taken as a fair guide that wood which is light when cut will take the ammonia fumes lightly.

Don't use your shellac heavy when used as an undercoat for varnishing; in fact, use it quite thin.

Don't use white shellac on dark mahogany, or any wood that has been stained quite dark, for the reason that age will bleach out the shellac and cause a milk-white film, even when material is used under several coats of varnish.

Don't forget that you can meet all conditions of colour by mixing your orange with white shellac to suit your purpose.

Don't use shellac where it comes in contact with water or damp conditions.

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THE GLUE BOOK

WHAT IT CONTAINS

Chapter 1—*Historical Notes*
Chapter 2—*Manufacture of Glue*
Chapter 3—*Testing and Grading*
Chapter 4—*Methods in the Glue Room*
Chapter 5—*Glue Room Equipment*
Chapter 6—*Selection of Glue*

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Veneers and Panels

Progress in the Veneer Department

THERE has been a considerable change in machinery and methods throughout the whole process of producing built-up stock. On consideration it appears that all the operations in the production of veneer work have been improved in some way. This change is apparent, not only in the laying of veneers, but also in gluing up core stock. Where formerly all core stock had to be jointed on the hand jointer, now we have continuous feed machines which will produce either a square joint or tongue and groove, either perfectly straight or slightly hollow, according to the individual preference of the user. In addition to these continuous feed jointers, we have a machine that will not only joint the stock, but also glue it together in the one operation, with a dovetail joint that is practically unbreakable. Both these machines have effected a great saving of time and of material, for even with a small continuous feed jointer the stock is held rigidly by the feeding chain, and it is never necessary to go over a joint a second time. It is estimated that one of these machines will turn out as much as four men on hand jointers. Since the stock is tongued and grooved, it is much easier to get the edges of the joints flush in the case of wood that is slightly sprung than it would be with a plain square joint. The method of gluing up this jointed core stock has also undergone a transformation. In place of the old-fashioned hand-screw clamps, taking a great deal of time to apply and taking up much useful space while the joints are drying, we now have quick acting lever clamps, often carried on a revolving frame. By this means, as one set of clamps is filled, it is moved on in the cycle, and another set of clamps comes into position for filling. This goes on until the first set of clamps comes round to the filling position again, by which time the glue has set and the glued-up core may be removed from the clamps.

Drying the Stock

To pass on from the core to the veneer, we are confronted first with the question of properly drying the veneer stock before gluing and laying. Where formerly it was the custom to take the veneers and stack them in a special frame with sticks by a method which wasted hours of time, so that they would presumably be kept flat in the process of drying in a department of the ordinary dry kiln, now there are several machine dryers in use. With these machines veneer is dried immediately before laying and the time taken is reduced to a minimum, both in putting the veneer into the machine and also in the actual time taken to dry the stock. Again, a further advantage of the machine method is that veneer is laid as soon as dried, instead of being taken from the drying rack as in the old method and probably standing some time before laying. This, of course, is on account of the large quantity placed in the dry kiln at one time, for the time that elapses between the removal of the veneer from the dryer and its actual laying affords a good opportunity for it to absorb moisture from the atmosphere, and thus undo the work of the dry kiln.

In the glue room the changes would be rather startling could one go directly from a glue room of eight years ago into one of the present day. Glue in buckets and brushes for applying the glue, which were the old-time essentials, are now conspicuous by their absence, and often enough the only wood to be seen in the glue room, apart from the actual building, is the stock being worked on. Wood frame presses and cauls have been replaced by all-metal presses and zinc, and—in some cases—aluminium cauls. The reason for the all-metal press is of course the heavy pressure requirements of present-day practice. The metal cauls are favored on account of the greater facilities they afford for keeping them free from stray drops of glue, and also their thinness which makes it possible to get more stock into one pressing. When gluing up large quantities of built-up stock which does not vary greatly in size, the hydraulic press, of course, holds first place, while for large panels we have press units with channel steel frames and screw pressure arrangements. These units can be moved around, and just as many used as are necessary to cover the given size of panel. In some cases, power screw presses can be used to the best advantage, but except for special sized panels, the hand power press has been displaced from the glue room. The discussion in the last issue of The Canadian Woodworker showed a considerable variation of opinion on the subject of the use of mechanical glue spreaders on high grade work such as piano cases. While one firm considers that the mechanical spreader affords a saving both of time and glue and makes for better gluing, a furniture foreman gives it as his opinion that the glue spreader does not permit of the regulation of the amount of glue applied as does the brush. It would seem that this furniture foreman has not become acquainted with the really up-to-date glue spreader, for it is now possible to glue one or both sides of a piece of veneer, and to regulate the amount of glue applied according to the nature of the wood. By varying the corrugations on the rolls, it is possible to obtain any thickness of glue.

In place of the glue bucket heated on a steam coil, we now have the water jacket tank with a mechanical stirring apparatus. Modern practice calls for the heater to be installed above the spreader, so that the glue can be drawn off directly from the heater into the trough of the spreader without any intermediate handling in pails. The very latest in the glue heater line is the electric and the advantages claimed for it are that the glue can always be maintained at an exact heat without the danger of "cooking," which will spoil any glue. Even the glue itself has undergone changes, and as one step towards the solution of the glue problem there has been introduced a vegetable glue.

All this makes one wonder how near we are to perfection. In the old days veneer work was turned out whcih was quite creditable in spite of what appears to

modern eyes to have been a tremendous handicap, but means are constantly being devised to improve on previous results. Some small difficulties are still apparent, of course, chiefly depending on the cost of improvements, which causes some people to adopt the erroneous course of rubbing along with what they have.

Glue Difficulties and How They Arise

WELL may the manufacturer of glue ask what is the use of taking care to sell a perfectly uniform grade of glue when the user treats each batch in a haphazard fashion, and therefore is constantly getting different results. The user sends in a complaint about a certain shipment and the manufacturer investigates. The user is certain that he has been handling the glue in the right way, while the manufacturer is even more certain that the fault is not in the glue, since he has spent money and time on exact tests. In a case like this, it is only by chance that the manufacturer is able to locate the cause of the trouble. Different boilings of glue from the same carload of stock may vary just as two bakings from the same barrel of flour may differ. By proper tests the glue may be graded and sold according to its real value, and that is the way it is sold at the present time.

Under these circumstances, the manufacturer is always able to be pretty certain that anything that goes wrong with the glue is caused at the consuming end. Foaming is a frequent cause of complaint. The cause is generally the overheating of the glue, but it is hard to prove this to the satisfaction of the buyer. The workman may come in in the morning and turn the steam full on and go away, leaving the glue to get warm. When he returns the blue is boiling, and he proceeds to regulate the heat to the proper degree. It is then too late, for the damage has been done to the glue, and poor work results through bubbles under the veneer. The factory man questions his employee about the glue. "Are you not making it too hot?" "No! you can see for yourself just the heat I am using." The workman probably did not think that the short period of overheating was sufficient to spoil the glue.

Another cause of trouble is dirty glue pots. A glue pot cannot be cleansed properly by allowing it to stand filled with cold water for a few hours and then rinsing it out. It must be thoroughly scalded to remove every particle of stale glue. Stale glue will spoil many times its volume of fresh glue, and yet men who have not gauged their supplies right will leave a quantity of glue in the pot over the week-end and mix fresh glue with it on Monday morning. Then they wonder why results are poor, and proceed to blame the man who sold them the glue. Glue will decompose in brushes if they are not properly cleansed, and just as soon as a dirty brush is dipped in some fresh glue it starts to spoil. The regulation of the consistency of the glue according to the wood to be used is another point that receives too little attention at the hands of some users. Glue mixed to the right consistency for joints in oak will be absorbed by pine, so that the joint is absolutely robbed. Then comes the kick, "This glue won't even hold pine."

An interesting illustration of how things may go wrong and leave everyone concerned right up in the air as regards the solution occurred in the plant of a piano manufacturer. At this factory the core stock was crossbanded and piled away for several months before the face veneers were applied. The crossbanding was glued so well that it could not be peeled off with a chisel, and yet after the face veneers were laid the crossbanding came right away from the core. This proved a puzzle for a considerable time, until it was discovered that the hot glue laid on for the face veneer had penetrated the crossbanding and killed the joint between the crossbanding and the core. Consequently, when the stock was taken from the press, the face veneer adhered to the crossbanding, but the crossbanding had lost all its hold on the core. The difficulty was overcome by laying the crossbanding and face veneers at one operation.

Ground glue is always preferable, because it only requires to be soaked one hour, as against a minimum of twelve hours for flake glue, and can be kept more uniform. On the other hand, there is always a temptation to dump the ground glue straight into the hot glue in the pot. This would settle to the bottom, and the water added to make up the correct consistency would mix with the hot glue, thus rendering the whole potful too thin. The glue should be soaked in clear cold water in a cool place for at least twelve hours in the case of flake glue—preferably longer—while the ground glue may soak sufficiently in one hour. In mixing glue, it is always better to measure it by weight, since one lot may be broken or ground finer than another. The same variation will be apparent in pailfuls taken from different barrels, and the variation will be carried on to the glue mixture. Then, although the grade of the glue may be absolutely uniform, the results are not the same, but the fault is not that of the manufacturer.

From the point of view of the glue manufacturer and of the dealer, care in the distribution of their product is the whole secret of success. It is most important to see that the buyer gets a grade suited to his work, and in this connection it may be said that no buyer can do better than place himself in the hands of a reliable and trustworthy dealer, who has the benefit of years of experience, specializing in glue, and who is qualified, therefore, to give accurate information on the glue to be used and the way to use it.

In regard to the constant upward trend of glue prices, it seems safe to say that glue will never be cheaper than it is now. On the contrary, it seems likely that there may be shortly a rather sharp rise. France, Germany and Austria, respectively the largest glue producing countries in Europe, are likely to produce no glue for an indefinite period. England will probably continue producing, but with no importation from the Continent she will not have nearly enough for her home trade. In America, the production has been largely diminished on account of the shortage of glue stock. When it is borne in mind that the importation of calf-skins from Russia and Austria into the United States amounts to twenty-one million dollars annually, which, of course, is absolutely stopped, it will be seen that the supply of glue stock will be seriously curtailed. Again, now that the supply of foreign gelatine material has ceased, it seems likely

that a great deal of the superior pieces now used for glue will be diverted to the manufacture of gelatine. While the supply of glue stock is diminishing the demand is increasing, and higher prices are only natural. It may seem strange to many buyers that high prices do not benefit the manufacturer. He cannot advance his glue prices in proportion to the rise in the cost of the raw stock and still retain his trade. Here is a case where some competition in the same field would not be unwelcome to the dealers.

There are other phases of this subject which will be discussed in a later issue of The Canadian Woodworker.

Further Discussion of the Use of Sound Wormy Chesnut

In the last issue of The Canadian Woodworker we published a discussion of the merits of sound wormy chestnut as a core material, and also of the advantages of the mechanical glue-spreader. We have since received a further expression of opinion on the subject —given hereafter. Our correspondent evidently does not think it is practicable to lay four veneers at one operation, but it will be noticed in another article ("Glue Difficulties and How They Arise") published on the next page, that a case is cited where this method of laying veneers proved the solution of a serious difficulty. While we believe that results will be much better when built-up stock is piled on strips as suggested, we see no reason why the surface veneer should dry out before the core, when all the stock is clamped up together in the press. It is conceivable that carelessness in the glue room may cause checks, but carelessness has no place in any part of the modern woodworking shop.

Cornwall, Ont., April 2, 1915.

Editor Canadian Woodworker:

In reply to your query in regard to the use of sound wormy chestnut as a material for veneer cores, I would say that, although my experience has been with the use of good lumber as core material, I think that this grade of chestnut should work all right, provided the worm holes were filled with whiting before cross banding. After cross banding, the stock should be piled on strips for a period of ten or twelve days at a temperature of about eighty degrees, then the face veneer may be applied and the stock allowed to stand on strips for another five days. This method gives good results on average work, but for high class piano work, I think only the best grade of lumber should be used for core stock.

The mechanical spreader is useful as far as I know, but it is out of the question to lay four veneers at one operation, and load the press with stock and cauls and expect the work to come out as level as with the old method. The surface would dry out before the core, causing shrinkage, with its accompanying effect of setting up checks in the surface.

Yours truly,
WM. EKINS.

Lots of cuttings that are waste so far as the order in hand is concerned may eventually be utilized for some good purpose, and for this reason should be saved. These cuttings, however, should not be piled out of the way and allowed to accumulate indefinitely, but kept near at hand to receive attention. Also, it is a good idea, in sending orders to the cutting room, to try and group them so that one will help utilize the waste from the other, which saves scrap accumulation and also makes for greater factory efficiency.

Specifications for Machinery Safeguards

THE Eastman Kodak Company has issued a circular to machinery manufacturers indicating its requirements as regard the safeguarding of machinery at the time of purchase. All machinery must conform, not only to the provisions of the New York State labor law, but must be provided with all proper safeguards for the protection of the operator and other employees. The company stipulates that if any deliveries made under a proposal do not fully conform to the specifications covering safeguards, it is at liberty to make any necessary changes at the expense of the seller.

Among others, the following protective devices are required:

1. Guards for all gears, even where apparently inaccessible, these guards to cover the full circle of the gear to mesh and to extend downward to the root of the gear teeth.

2. Flywheels, pulleys, or gears without webs or filled-in spokes are to be fully protected, and where necessary the rims are to be guarded.

3. Projecting set screws and keys on revolving parts, if used, are to be covered and key seats on projecting shafts are to be filled, or, where possible, the shaft is to be covered.

4. All sprockets are to be thoroughly guarded.

5. Wherever necessary, provision is to be made for instantly stopping and starting the machine by the operator.

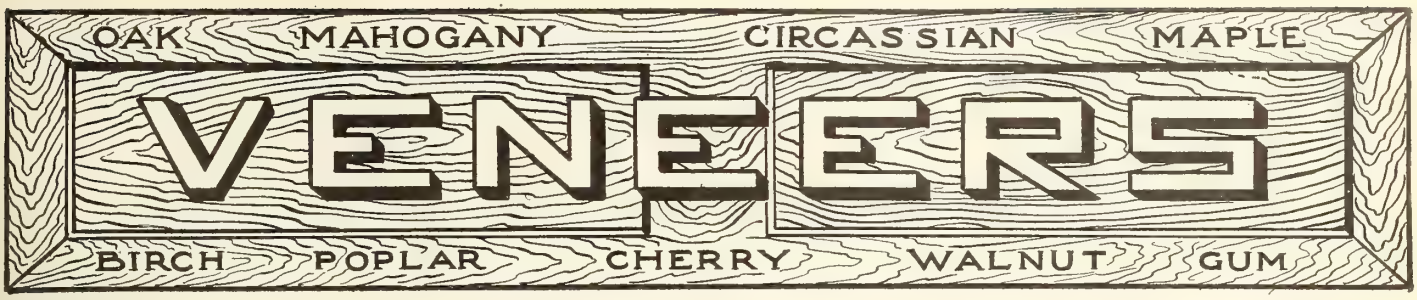
6. All levers and switches controlling movement of machinery are to be so constructed that they can be locked to prevent the starting of machine.

7. All machinery, such as woodworking, to which guards are customarily applied by the purchaser, is to be provided with such guards before delivery. In all proposals the manufacturer is to specify the type of protective devices to be applied.

There is room for quite a lot of argument and the working out of details by diagrams to demonstrate what is the best spacing for machines in a factory to get the greatest degree of efficiency. There are two sides to this, as to other questions. There is the one side of having plenty of free room around a machine to get the best service with the least hampering. The other side of the argument is based on the theory that the closer you can get machines together the less time is wasted in conveying stock from one to the other, and the fewer steps are necessary on the part of workmen in getting from place to place. Perhaps we may never be able to lay down any hard and fast rules, but we should be able to get some light on the subject by a free exchange of ideas.

One of the best ways to save waste in the manufacture of veneer is to make less of it—do a higher and closer order of work, to the end that there may be a marked reduction in the percentage of trimmings and other waste. It can be done, and it is mainly a matter of closer manipulation and a better order of work. Try it.

Any formula for a given amount of glue to cover a certain number of surface feet should be modified to harmonize with the kind of wood used, because some require much more glue than others to get a good joint.



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Let us figure with you.

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The Circular Saw

BEFORE history was written, primitive man was acquainted with the hand saw. Perhaps his knife became nicked and he found that by working it back and forth he could make it cut a new way. Or perhaps the suggestion came from the ragged edge of a shell, or the peculiar weapon of the saw fish.

But whence came the circular saw? This was a recent invention. The Pilgrims cut their boards by digging a pit, laying logs across, then working up and down a two-handed

Fig. 1.

saw. The man below was the pit sawyer, the man above the top sawyer.

The first sawmill was built on the same principle—only that the saw worked up and down by power. Then several saws were worked together in a gang. The next step was the use of the circular saw. Just when it was invented, or where, is uncertain. The first patent in England was granted in 1777. The practical use for wood-cutting began about 1790. The general use in the United States dates from about 1820. These early saws were thick and crude, made only

Fig. 2.

on special order. The mandrel hole was square. The plate was not always solid, sometimes having a toothed rim and spokes like a wheel. For power, at first water was used, then steam. In some western States they were driven by horses walking around. In 1839 the inserted tooth was invented, which proved a distinct advance over the solid tooth.

The principal changes since have been in the quality of the steel and workmanship. The saw must cut continuously and at high speed. Heating and stretching must be anticipated. Allowance must be made for hard or soft wood, especially if it is frozen.

Simonds' world-famous circular saws begin with the making of the steel at Lockport, N.Y. Here is a remarkable

Fig. 3.

steel mill, thoroughly modern, driven by power from Niagara Falls. Only the highest quality crucible steel is made. Into the crucible goes the finest Swedish iron, the proper per

Fig. 4.

cent. of carbon and carefully chosen alloys. These elements are fused at a temperature of 3,000 degrees F. Then the pots are emptied into a large ladle to give uniformity to the

Fig. 5.

mixture. A sample is taken and tested in the chemical laboratory. The ladle is emptied into ingot moulds. These ingots are then heated red hot and passed back and forth

*Published by courtesy of The Simonds Canada Saw Company, Limited, Montreal.

through the rolls until they are flattened into plates of the right gauge. These plates pass to the shearing department, where they are given their circular outline. They are then shipped to three of the Simonds plants—Fitchburg, Chicago, and Montreal. The soft stock is unloaded and stacked in suitable racks in the storeroom.

The first operation in the making of a circular saw is the drilling of the centre hole. Then comes the toothing, which is done with a die in a press (Fig. 1). Each fall of the die stamps out a gullet and forms a tooth. Circular saws

Fig. 6.

have from 4 to 400 teeth. The gullets are rounded out with an emery wheel, and the teeth shaped more evenly. Then on the anvil the teeth are "knocked down" or straightened (Fig. 2).

The saw is now fully formed ready to be hardened and tempered. These operations are most important and mysterious. The soft steel is heated in an oven until it becomes cherry red. It is then plunged suddenly into an oily hardening fluid. A wonderful internal change has taken place in the arrangement of the molecules, especially in the disposition of the carbon. The saw that could be bent and stamped so easily has now become very hard and brittle. It can be easily cracked and broken. Before it has time to

Fig. 7.

cool it is heated again to about half the former temperature, this time under pressure. By this method much of the hardness is withdrawn and the saw comes to the right toughness and spring. The pressure keeps it very flat, otherwise the heat would greatly distort the plate. The inspector now tests the teeth by bending them back and forth (Fig. 3). If they show the right temper he passes the saw to the smith.

Smithing is the most skilled operation in saw-making (Fig. 4). The smith lays the black saw on the anvil and examines it carefully with a straight edge. Any little lumps and hollows must be hammered out. The first steps in tensioning are taken. By tension is meant the stretching of

Fig. 8.

the steel. The saw must be looser in the centre than at the rim. This anticipates the cutting, when the rim will be heated and stretched. The saw returns to the smith after

Fig. 9.

each of the following operations, to be corrected, and to have the tension further improved. Fig. 5 shows the master smith making his close examination before stamping the saw with

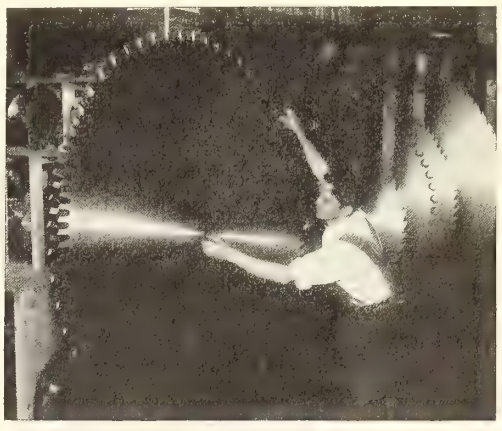


Fig. 10.

its final marking. The saw can now be ground until its beautiful steel color is brought out and the plate is reduced to the right gauge or thickness (Fig. 6). The grindstones

are of Ohio sandstone, some of the largest weighing eight tons.

In the polishing operation the saw is made to revolve rapidly in a protected case (Fig. 7). Against the moving plate are held the polishing agents, first a block of emery, then cork with emery powder, finally cotton waste and oil. The saw now has a beautiful mirror face.

The manufacturer is proud to put his name on it. Well-inked labels bearing the name "Simonds" are rubbed on the plate. The paper is washed away and strong acid brushed on. This eats its way into the parts left uncovered by the ink. When the ink is removed, the trade mark is so clear and deep that long usage will not wear it off.

The saws which are to be set next have their teeth bent, one to the right, the other to the left (Fig. 8). This is to give clearance. Other saws are roll swaged, i.e., the teeth are flattened or spread for clearance. The filing is done largely by machine and finished by hand (Fig. 9). The tooth that leans away from the filer receives the edge. Care is taken not to file the whole tooth, but only the part where the edge meets the wood.

The saw is finished. Before it is shipped the inspector makes a thorough examination of every part, comparing the specifications with the original order (Fig. 10). Nothing escapes his careful attention. When he passes the saw it goes at once to the shipping room, where it is placed in a wooden case that covers the sharp teeth. The address of the customer is printed on with a stencil. The shipping bill is made out on the typewriter. The saw speeds on its way to the mill, where it will do its work.

Circular saws have grown steadily in size until the largest practical saw is 84 inches. A show saw for the Alaska-Yukon Pacific Exposition in Seattle, 1909, was made 130 inches in diameter. Circular saws are divided into solid tooth and inserted point, splitting and cut-off, wood saws and metal saws, straight and curved.

While the band saw is coming more into favor the circular saw still holds its place, and will probably never be superseded for certain kinds of work.

Pre-eminent among these whirling discs of steel stand those branded "Simonds." In the quality of the steel, in the uniformity of temper, in the excellence of workmanship, they have never been surpassed.

Hydraulic Pumps and Valves

Bulletin No. 5000 of The Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, contains some interesting practical information about hydraulic pumps and valves which cannot fail to be of interest to many readers of The Canadian Woodworker. It is pointed out that good hydraulic pumps, valves and fittings are the essential parts of any hydraulic press outfit, and that the successful operation of the presses depends upon them. Certainly good work cannot be expected from presses if they are operated by poor pumps and controlled by poor valves and fittings. The Hydraulic Press Manufacturing Company have been studying the design of hydraulic presses and pumps for some forty years, and they have a strong claim to pre-eminence in the quality and service of their products. The illustrations in the bulletin in question are particularly illuminating as regards practical detail.

Uniformity in Glue

UNTIL about fifteen years ago, the only distinct grades of glue recognized were hide glue and bone glue. There was no effort to supply glue of uniform strength. Glue was sold for whatever the individual buyer would pay. For example, a fair dealing buyer paid ten cents, and his neighbor, who was capable of driving a hard bargain, got the same glue for nine and one-half cents, or nine and three-quarter cents. This was patently unfair, but it was the business custom of those days.

Around the time mentioned, there arose a change in the glue business in Canada. Uniform grades, kept uniform by careful tests, were introduced by the firm of Delany & Pettit, Limited, of Toronto, who, we believe, tested and graded every batch and kept records of all shipments, so that it was possible to check up the results. This firm, we understand, have spent a great deal of time and money in perfecting their tests, and we are told they can supply a glue that may safely be taken to correspond with the figure placed on it. Delany & Pettit, Limited, have a Dominion-wide trade, and have been so successful in keeping their grades uniform that their customers believe in their judgment.

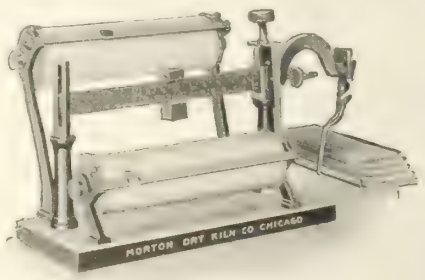
The firm have a business record both in the character of their products and their method of dealing which is their main asset.

Measuring Moisture in Green or "Dry" Lumber

By B. D. Curtis

EVERYONE connected with the lumber industry or its use in manufactured products is well aware of the difficulties encountered in properly seasoning or removing the moisture contents without injury to the lumber, and its susceptibility to atmospheric conditions after it has been thoroughly seasoned. There is perhaps no other material that gives up its moisture with more resistance than does wood. Even after the most careful treatment through the dry kiln to remove the moisture without injury to the wood, it will greedily join hands with nature and again take back from the atmosphere that of which it has been robbed.

During the last few years numerous improvements have been made in dry kilns. Without a doubt the one improvement that has thrown more light on this subject than any



The Model B Troemroid Scalometer.

other, has been a new instrument recently perfected and placed on the market for accurately determining the moisture contents of the lumber before it is put into the dry kiln, as well as when it is removed.

It is the custom of most of the larger saw mills cutting soft woods to put this lumber through dry kilns and work it up in their own planing mills into building material. In the drying and making up of this class of material, there is no doubt but that in a great many instances the lumber is left in the dry kilns longer than is necessary and is dried down so that there is only 2 per cent. to 3 per cent. of moisture left in it. Inasmuch as this material is to be shipped from the mills to wholesale and retail yards, it will again absorb from the atmosphere up to as high as 8 per cent. or 9 per cent. of moisture and this will be its condition when it reaches the user.

In regard to the saw mills that are cutting hardwoods, this field of manufacture during the last few years has been entirely reversed. Some years ago nearly all of the hardwoods were cut through the northern states in close proximity to where they were manufactured into finished pro-

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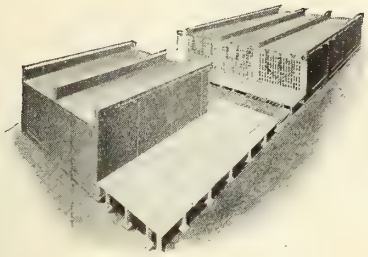

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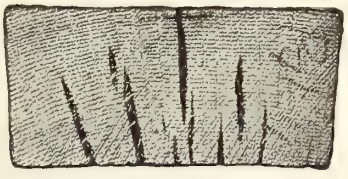
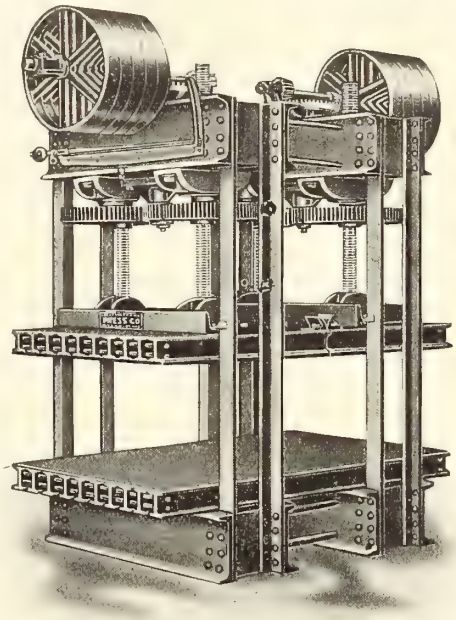


VENEER PRESSES



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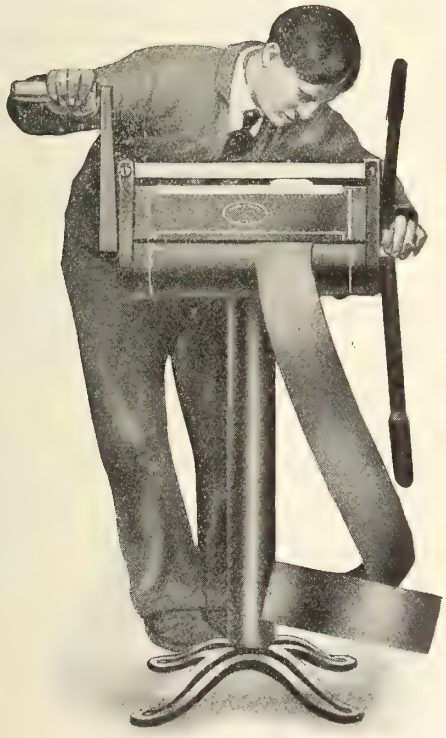

Rapidly Makes a Perfect Hinge

The "Jackson Belt Lacer" is a device that will soon pay for itself in any factory where belts are used. Not only in the actual lacing is the "Jackson" an investment but also in the smooth running "Jackson Laced Belt" that saves your power, pulleys and bearings.

Any shop man can lace the biggest belt you have with a "Jackson". It takes 3 minutes time and one cent for materials to lace a five inch belt on a "Jackson" and the joint will stand a tensile strain of 75 per cent. of the belt's strength.

With each "Jackson" is supplied 6,000 inches coil lacing, and all necessary tools.

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C. B. Fuller, Jr.

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ducts, but this supply has been nearly exhausted—especially is this true of the oaks—and most of these hardwoods are being cut through the Southern States and shipped north to the manufacturing plants where they are made into finished products. On account of this condition, very few of the southern hardwood mills are equipped with lumber driers and the material after being cut is piled in the yards from three months to a year or more to allow it to air dry and is then shipped north. This method of producing and selling hardwoods has caused more or less friction from the fact that there is a large range of opinion between the manufacturers of hardwood lumber and the buyers as to what well air-dried lumber really means.

The mill that can offer for sale lumber that contains only 15 per cent. to 25 per cent. of moisture should command a premium over the mill that is offering lumber with 30 per cent. to 35 per cent. moisture, as the purchaser is getting lumber with less water. There is also a saving on freight and in securing stock that can be put through the kilns in less time and with less loss in shrinkage. What may seem like well air-dried lumber to one person or firm may not appeal to another. Think of the arguments and disputes that could be eliminated in this way alone if buyer and seller both knew the exact moisture contents of the lumber at the time the sale was made.

As much attention should be given to the matter of moisture conditions as to the grade and quality in selling and buying of lumber and every wood working industry buying lumber from the mills, as well as the mills themselves, should be provided with some means for accurately determining the moisture contents of the lumber and be prepared to sell or buy it on the basis of moisture test as well as grade.

The instrument illustrated in this article was designed and put on the market especially to meet these requirements, so that the saw mills as well as all of the different woodworking industries could quickly and accurately determine the moisture conditions of the lumber at any stage of its manufacture from the time it is cut from the log until it is turned out a finished product.

The Troemroid Scalometer, Model A, is particularly suited to the requirements of woodworking industries using air-dried or kiln-dried lumber, while the Model B, as illustrated, covers a range that makes it suitable for testing the moisture contents of either lumber green from the saw, or air-dried or kiln-dried. The Model C Troemroid Scalometer is made for use in saw mills not equipped with dry kilns.

The instrument is a special scale of extreme accuracy fitted with agate bearings with screw adjustment for balancing. The beam is graduated from 0 to 2 ounces divided into 100 parts, each division representing 1/50 of an ounce; and by using the pointer attached to the beam weight the 1/100 part of an ounce can be weighed. The percentage table No. II. has a range from ½ of 1 per cent. to 30 per cent. and is designed for use where extremely fine results are needed, or where a very small amount of moisture is present. Table No. III. ranges from 30 per cent. up to 90 per cent. There are three models as described below.

All lumber intended for testing should be selected from boards of fair average quality. If air-dried or kiln-dried, select one about half way up the height of the pile of lumber and two-thirds the height of the kiln car. Do not remove the kiln car rom the kiln until after the test. Three or four test pieces should be cut from near the middle of the crosswise section of the board ⅛-inch to 3-16-inch thick. Brush off loose sawdust and splinters. When the test pieces are placed on the scale pan, be sure their weight is less than 2 ounces and more than 1¾ ounces. If necessary use two or more broken pieces. It is better if the test pieces can be cut off on a fine band saw.

Set the base of the scale on a level surface and accurately balance the scale beam. Put the test pieces on the scale pan and note their weight on the lower edge of the beam. Set the indicator point on the horizontal bar at a number corresponding to this weight, which may be found on the cylinder at top of the table. Dry the test pieces on the Electric Heater 30 to 40 minutes, or on the engine cylinder two or three hours. Weigh them at once and note the weight. Then turn the cylinder up and at the left of it under the small pointer, find the number corresponding to this weight. The percentage of moisture lost is found directly under pointer on the horizontal bar first mentioned. The lower portion on the cylinder Table No. II is an extension of the upper portion and is manipulated in the same manner except that the bottom line of figures are used for the first weight and the right side of cylinder for second weight, and the cylinder is turned down instead of up when used.

Concrete Examples

Model A, Table No. II., Kiln-Dried or Air-Dried Lumber: If first weight is 90½ and the second weight is 87, the cylinder table will show the board from which the test pieces were taken had a moisture content of 3.8 per cent.

Model B, Tables Nos. II. and III., Air-Dried Lumber (also green and kiln-dried): If the first weight is 97 and second weight 76, the table will show 21.6 per cent. of moisture. Use lower cylinder.

Model C, Table III., Green Lumber: If the first weight is 94 and the second weight 51, the table shows 45.8 per cent. of moisture.

The Curtis Electric Heater is specially designed to quickly dry the test pieces without charring them. It can be attached to any electric light socket of 110 volts, direct or alternating. A metal rack is provided to hold the test pieces vertically on edge. Turn the test pieces over once or twice while drying.

The Morton Dry Kiln Company, Great Northern Building, Chcago, Ill., are the inventors and manufacturers of these devices and they have recently issued a new catalogue No. 50, giving complete description and illustrations and price list, a copy of which they will be glad to mail to anyone interested in the subject of moisture in lumber. A valuable table compiled by this company is furnished free with the instrument, which gives the characteristics of 45 species of commercial woods, and which alone is very valuable to anyone interested in the lumber industry.

Daykin & Jackson, Limited, have been incorporated at Armstrong, B.C., with a capital stock of $75,000, as packers and canners, and dealers in fruit and vegetables. They will also manufacture boxes, crates, barrels and baskets, and are authorized to erect mills and to buy logs and lumber for that purpose. The incorporators are F. T. Jackson, G. B. Clark, T. Cummings, R. R. Perry, and M. M. Gamble, all of Armstrong, B.C.

The eighteenth Annual Convention of the National Hardwood Lumber Association will be held in Chicago on June 10th and 11th. The Convention Headquarters will be the Hotel Sherman. Mr. E. V. Babcock, Pittsburgh, Pa., is President of the Association, and Mr. Frank F. Fish, Chicago, Ill., is Secretary-Treasurer.

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The saw can be set to cut at any angle and can be raised or lowered 8 inches. This operation makes no difference to the belt as is the case with other makes of machines. There is no overhanging slide. The table is clear of all obstructions; all work is in full view, and is operated with 1½ h.p. Motor.
Patented in U. S. A., January 16, 1912. Also in England, Australia and France. Other patents pending.

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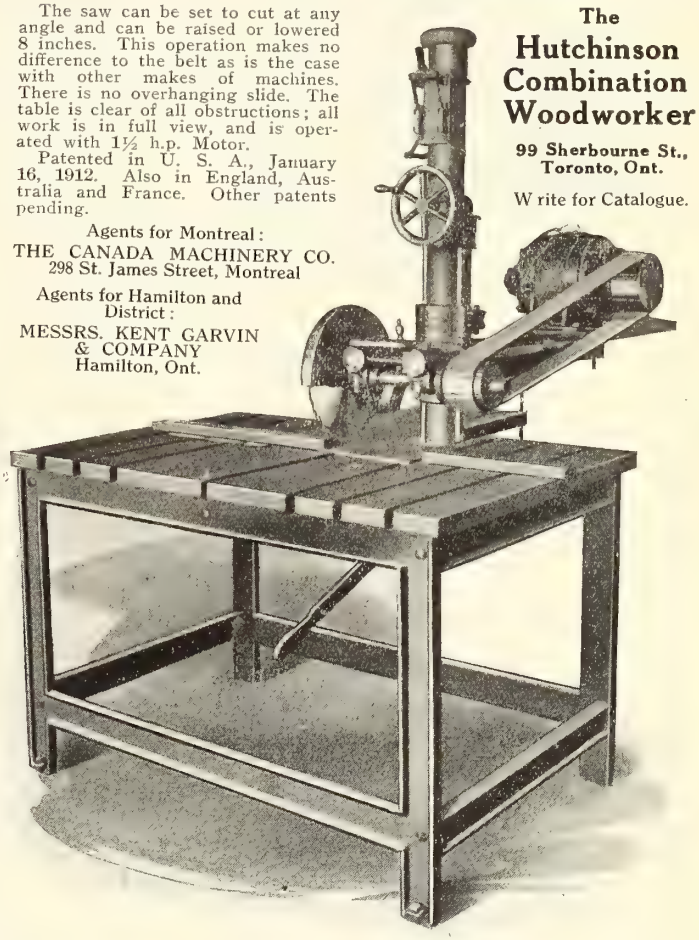

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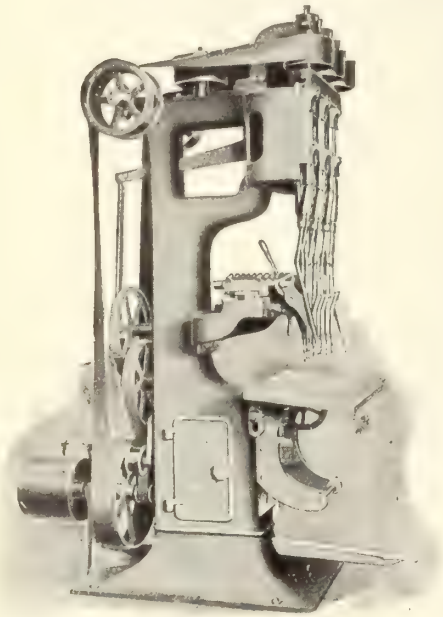

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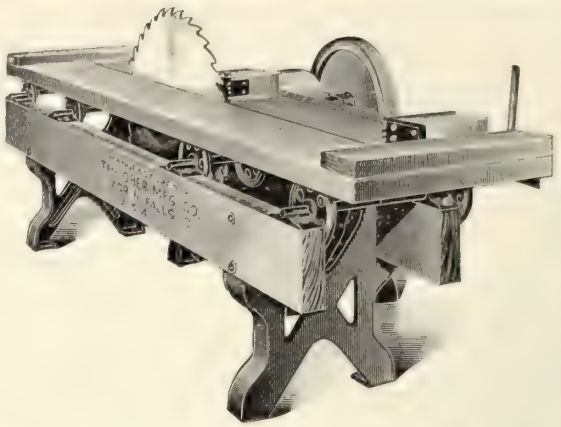

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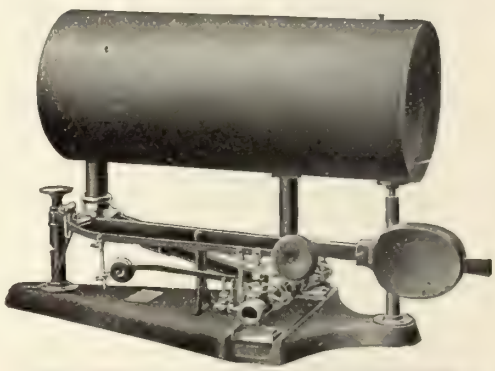

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For Alphabetical Index see page 4

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Sheldons, Limited, Galt, Ont.

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Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
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MITRE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

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Pryibil Machine Company, P., New York.
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Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

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Pryibil Machine Company, P., New York.

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Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

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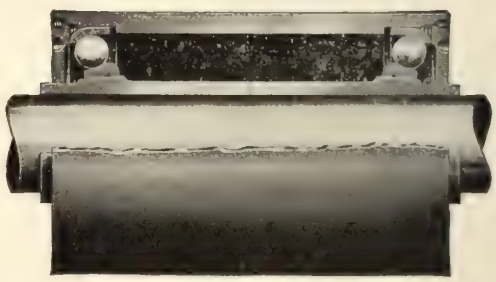

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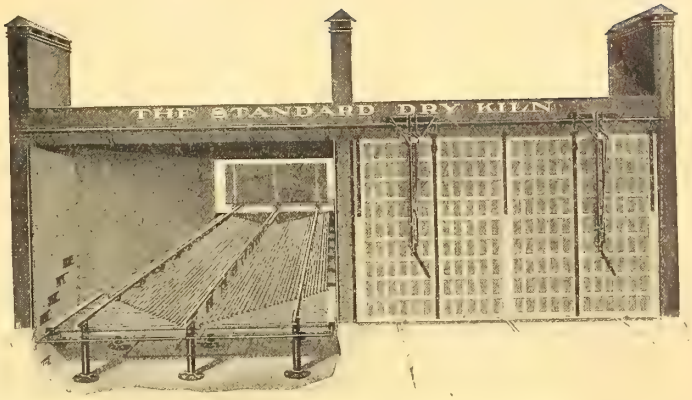

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Volume Fifteen TORONTO, MAY, 1915 Number Five

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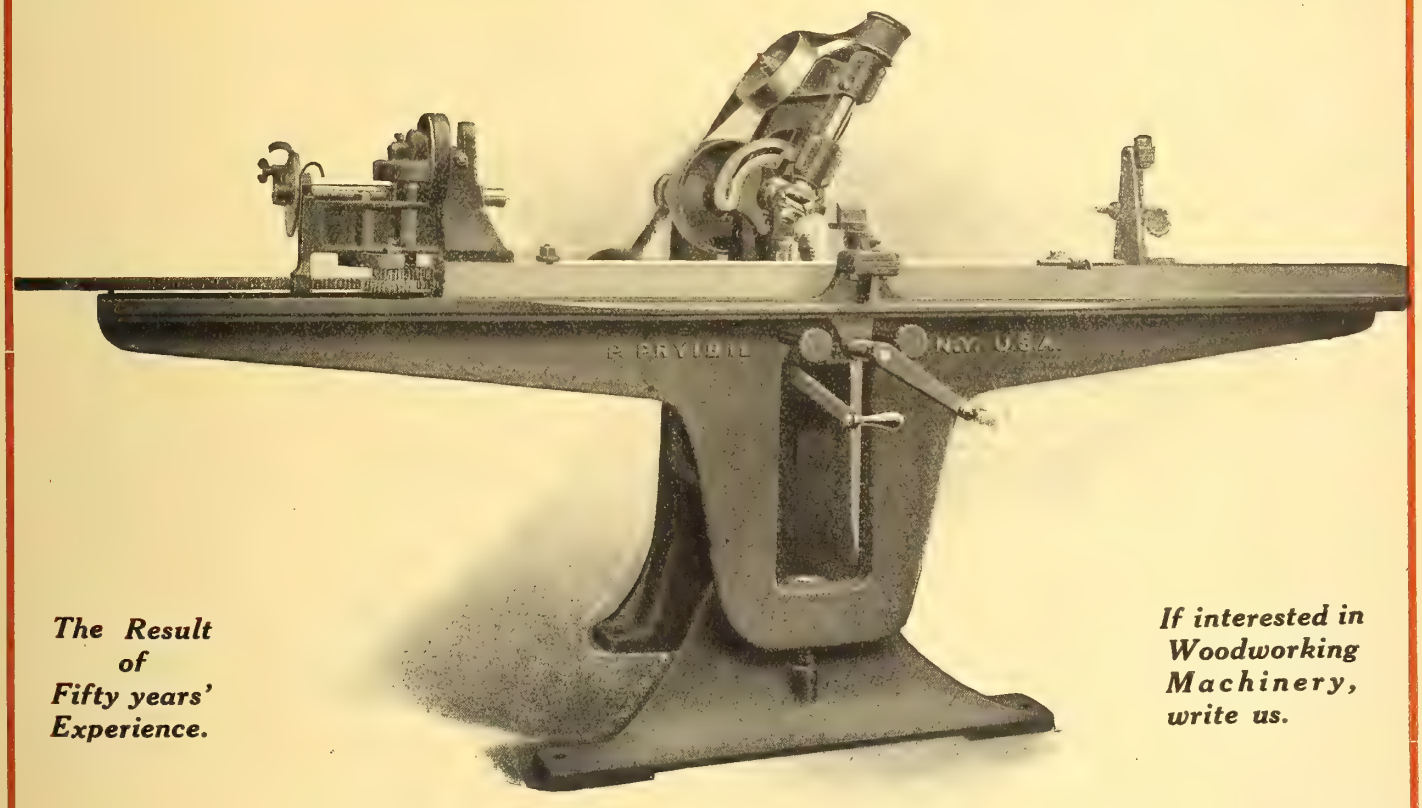
and
Furniture Manufacturer

Jacobean Twist Work



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This machine will produce all kinds of spiral or rope mouldings, either straight, tapered, curved or oval. It will make right, left, and pineapple cuts and will do straight and irregular fluting. It will cut from one to six threads on a piece, and will make any degree of twist from one turn in one and one-half inches of length to one in ten and one-half inches.

The cutters are similar in shape and arrangement to those used on variety shapers, and are made of the same steel. They revolve always in the same direction, whether the twist be right or left, and one set will produce several different shapes of work. Changing from one degree of twist to another, or from right to left, takes less than one minute. This machine will swing eight inches, and will take 5 feet to 10 feet between centres, according to length ordered.

A Medallion Fluting Attachment will produce radial fluting on flat work up to 9 inches square, or 6 x 12 oblong.

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If your belts are slipping your entire plant is slipping, men included. Time is wasted. For maximum efficiency you need a strong and extremely pliable leather belt that has a pulley gripping surface. In short you need "Crown" Planer Belting. This belting is ideal for use on planers, matchers, etc., where it must take short turns over small pulleys, and carry a heavy load.

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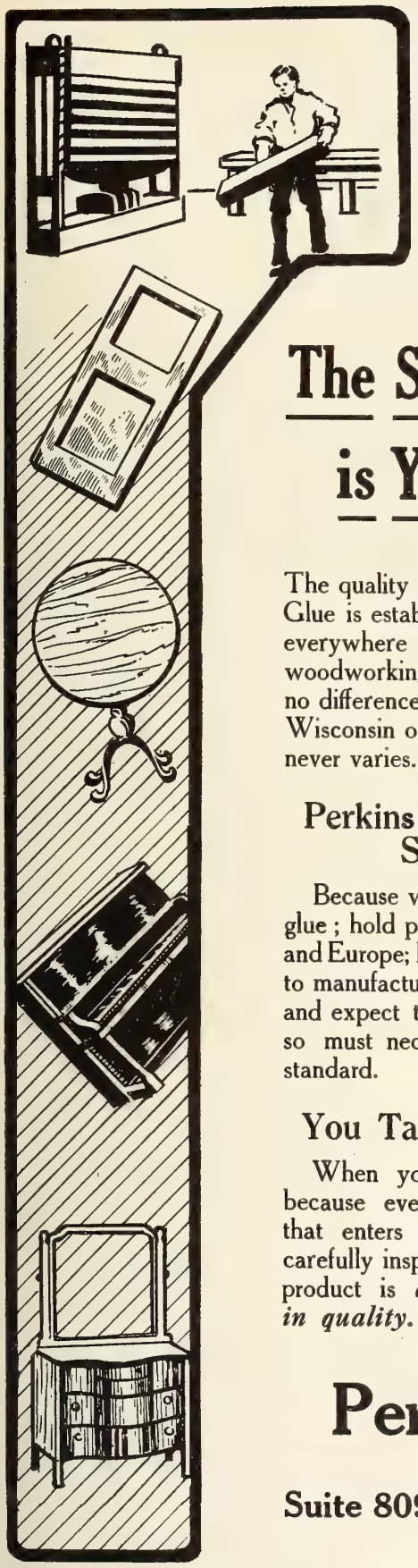


Glue Room Economy

The Strict Maintenance of Quality is Your Guarantee of Security

The quality of Perkins Vegetable Glue is established and maintained everywhere glue is used in the woodworking industry. It makes no difference whether you use it in Wisconsin or Alabama, the quality never varies.

Perkins Quality is the Standard

Because we originated vegetable glue ; hold patents in United States and Europe; have no business except to manufacture and sell our product and expect to have no other and so must necessarily maintain the standard.

You Take No Chance

When you use Perkins Glue, because every pound of material that enters into the make-up is carefully inspected and the finished product is ***absolutely uniform in quality.***

Satisfaction Guaranteed

Covering a number of years, all classes of stock, and the total number of factories where we have installed our glue, the high per cent. of the business we now hold proves that our glue and methods satisfy our customers. ***We guarantee satisfaction.***

Quality and Efficiency

If you and your workmen know that the glue in use is uniform in quality and can be relied upon to do the work for which it is intended, it naturally follows that ***you will get more and better work.***

May We Demonstrate?

Why don't you have a Perkins demonstration? We will demonstrate to your satisfaction—in your own factory—that Perkins Vegetable Glue will ***give the best results and cut your glue room costs.***

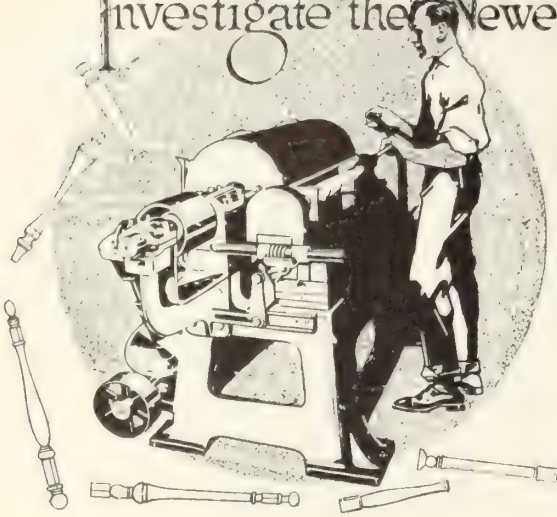
Perkins Glue Company

Originator and Patentee of Vegetable Glue

Suite 809-810 J.M.S. Bldg. - South Bend, Indiana

Perkins Glue

Investigate the Newest Shaping and Turning Machine



Made in Canada

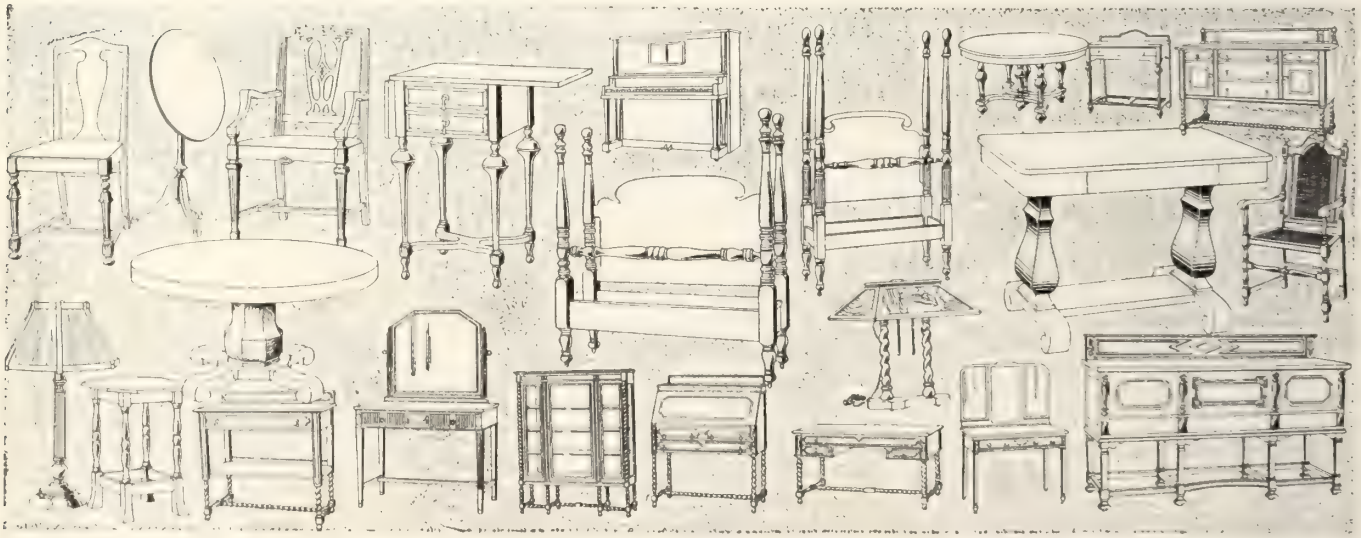
This new machine has tremendously simplified the making of chair parts, dresser and bedposts, table legs, dining table pedestals, etc., of the most popular furniture designs —square, round, hexagon or any polygonal shape.

Most Economical Method for Making Turned Work

You needn't have great numbers of each pattern to make this new machine profitable in your plant.

Glance at the drawings below. Anything like what you make? Every turned part can be made more economically and accurately than with hand lathe and band saw methods. Your work in particular can be turned more efficiently than by any other method. Recent installations of this new machine in other furniture centres prove its advantages. Its usefulness is appreciated through the saving it accomplishes.

Ask for "complete data" on the latest method for shaping and turning furniture parts.



Address—Berlin Specialties Dept., Hamilton, Canada

The Berlin Machine Works Ltd., Successors to The Wood Turning Machine Co.

A Canadian Organization That Serves the Interests of Canadian Wood-Workers

Berlin Wood-Working Machines Are MADE IN CANADA

The "BERLIN" Line

ALL TYPES OF

Planing, Sanding and Sawing Machinery for Saw Mill, Planing Mill and Factory.

Investigate Berlin Machines for Your Needs.

Berlin Machines Were First Built at Berlin, Wis., U. S. A.

The name "Berlin" has been closely associated with the woodworking industry even since the first power feed drum sanding machine was built in a little shop at Berlin, Wis., U.S.A., nearly thirty-five years ago.

Later the company moved from the little town that gave the concern its name—"Berlin" Machine Works. They added to their line—began building and perfecting planing and sawing machinery as well as sanders.

For years they manufactured woodworking machinery of various types for saw mill, planing mill and factory for the U.S. and Canadian trade at their Beloit, Wis., plant.

Then the desirability of handling Canadian business from a directly-in-Canada organization became evident. A branch factory with offices was built in Hamilton, Ont., in 1908, which today is one of the best-equipped plants of its kind in Canada.

Every Canadian woodworker should have a general catalog of Berlin Canadian-built Woodworking Machinery.

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Largest Manufacturers of Woodworking Machinery in the World

U. S. PLANT - - - - BELOIT, WISCONSIN

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The following books are offered at special prices subject to previous sale:

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The Book of Lumber Shed Construction, by Met. L. Saley. Published by American Lumberman, Chicago. 176 pages, illustrated. Price $1.00.

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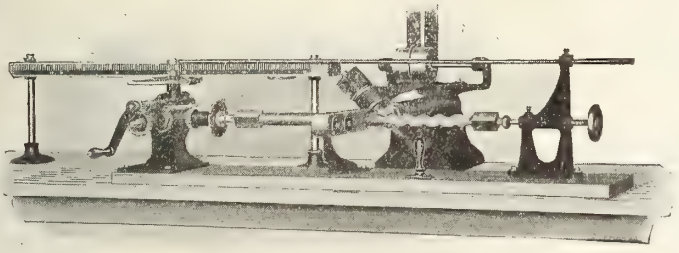

This machine will produce twist and spiral Columns, Balusters, Table Legs and Pedestals, Chair Posts and Spindles, etc., right and left turn.

The cutter used on this machine is in two parts; the cutting edges on each half are milled angular, giving a shear-cut effect.

The dividing plates will space 2, 3, 4, 6 and 8-in. Special plates furnished on application.

The feed gear set gives one turn in 1½, 3, 4½, 6, 7½ and 9-in.

The centers will swing any diameter up to 12-in. Length, 4, 6, 8 and 10-ft.

For prices and further description write

The Shawver Company

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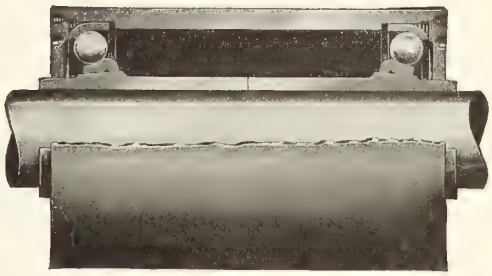

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Our loose Pulleys cannot run hot and do not cut the shaft.

Write us for particulars and price list.

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Good Steel, Carefully Manufactured, Scientifically Tempered

Our **GLUE JOINT CUTTERS** Make a Perfect Joint.
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We carry a full and complete stock of all kinds of Veneers, in Red Gum, Mahogany, Oak, Poplar, Yellow Pine and Birch.

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Branches: Montreal, Vancouver, Chicago, New York, London, Eng.

345 Adelaide St. West, Toronto
Phone Ade. 2700

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Vol. 15 **May, 1915** **No. 5**

The Dawn of Better Things

"Still achieving, still pursuing,
Learn to labour and to wait."

THAT the night of depression which came upon us last fall is being followed, in the natural order of things, by the dawn of confidence is evidenced in many significant developments of the last month. One of the best signs of improved commercial conditions is the increased earnings of the railroads. The business transacted by the Canadian Pacific Railway has come to be regarded as a sort of barometer of Canadian prosperity, and it is worthy of note that the net profits of that road for February, 1915, were nearly forty per cent. more than they were in 1914. This is attributable in substantial measure to the gratifying returns of the gross earnings for the month.

The C. P. R. figures are the forerunner of the general expansion of commercial activity which Sir George Foster has been predicting. The C. P. R. is a well-managed road, but so is Canada a well-managed country, and with business conducted on sane and conservative, yet withal on enterprising lines there is no reason why the experience of the railroad should not become a general one. The ever-increasing strength of the allied forces, the disclosure of Great Britain's mighty reserve of men and money, and the desperate measures to which the enemy has had to have recourse, have had effect—measurable and striking effect—at last, and as a result we find uncertainty giving way to certainty, and shaken faith to renewed confidence. The financial outlook is brightening, and on nearly every side the markets are reflecting the improvement in the tone of business. The underlying economic conditions are sound, and there is every reason to believe that the general advance will proceed.

Building prospects are of vital interest to the woodworking trades. Capitalists translate their confidence in terms of dollars and cents, and a fair measure of building may be expected this season. Many there may be who will hold back, but many there must be who will recognize the advantages of building this season. In the building line materials and wages have been on the upward grade for years, and everything points to a continuance of this tendency at no distant date. Materials will never be cheaper, labor will never be more plentiful, and one would not be speculating very wide of the mark in saying that contractors' estimates will be ten per cent. higher next year than they are this.

The time for speculating as to the trend and duration of the War has passed. It is little of our concern just how long it will take to bring the enemy actually to his knees. We who are not contending on European soil have to do more with contributing our bit to the business stability of the country. The cause of the Empire and that of the Allies may safely be left in better hands than ours. Our course is clear. The rejuvenating spirit of spring is upon us, and **now** is the time for action.

Yours truly,
The Canadian Woodworker.

Safety in the Factory—Prevention Better than Cure

THE incorporation at Toronto of The Woodworkers' Accident Prevention Association, organized for the purpose of introducing and promoting measures designed to prevent accidents in the woodworking industry calls attention to a matter which is of vital interest alike to the workman and the employer.

The determining causes which have tended in recent years to increase preventable accidents are—the introduction of new industries, inadvertence on the part of the worker, the fallibility of machinery, the inadequacy of safeguards, and, last, but not least, the employment of insufficiently trained men in hazardous conditions, combined with the "speeding up" system.

The primary responsibility for safety in the factory devolves upon the employer, but if conditions conducive to safety are to be promoted and maintained there must be intelligent co-operation between employer and man. The one has property and interest to protect, and the other life and limb. In the one case the loss is measurable and retrievable: in the other it is inestimable. The employer is confronted with the alternative of prevention or compensation. The injured employee must prove the absence of proper protective measures, and show that he was not guilty of contributory negligence.

In the installation of safeguards the employer must be governed by the possibility, and not by the improbability, of the occurrence. This is a principle

which may well be digested by superintendents and foremen.

Safety devices should be made fundamental parts of all machinery. Where devices are available, cautionary notices and danger signs are inexcusable. A safeguard has permanent value in its protection; the usefulness of a placard is lost when it fails to arrest attention.

Our Motto—"Service First"

The Canadian Woodworker and Furniture Manufacturer is a service manual first and last. We are endeavoring to emphasize this more in every issue, and it is gratifying to find that we are having the close co-operation of our readers. We are striving to place the hall-mark of organized efficiency upon every page of this journal, and we believe that our aims and work are reflected in the contents of this number—although we are conscious of certain shortcomings and of the opportunity of still further improvement: we are human, and therefore fallible.

We ask the reader to look carefully through these pages and see whether he cannot find a fair quota of helpful, practical information. If he really cannot do so, we ask him to let us know, giving us suggestions as to the kind of information that he is looking for. We ask him to study the Question Box, and the Finishing and Veneer Departments, remembering that it is a special function of The Canadian Woodworker to afford the solution of all kinds of practical problems encountered in the trade. We place at his disposal the accumulated facilities of a journal which may rightly claim to be the established medium of the woodworking interest in Canada.

We desire to impress these things upon our readers, so that they may realize more fully our desire to be of service to them. The editorial contents of The Canadian Woodworker are a matter of personal concern to the publishers, who realize that in extending the facilities opened up in these pages they are establishing the journal in a position of undisputed pre-eminence in its field.

The reader is invited to consult us at all times—and there will be no charge for the consultation. We believe that we can show our ability to furnish in a comparatively short time valuable information which the individual workman could not secure without the expenditure of much time and effort.

In the way of securing safety around machinery, the need for guards beneath overhead belts is influenced by the size and speed of the belt, as well as by the height of the pulleys and the distance between them. To take a particular instance: how many times is a proper guard used under the drive belts of exhaust fans, which almost invariably run at high speeds? Nothing very complicated is required in a case like this—a board rather wider than the belt and placed close to it is all that is necessary—and yet even this is too much trouble in most plants.

We hear of factories where guards already installed are inadequate to withstand the shock or blow that would be delivered by a broken belt. Such guards do not improve matters, but increase the hazard. Unless such guards are substantial and are fitted close to the belts, well up and around the pulleys, it is better to omit them altogether, perhaps. Then, again, a considerable number of accidents in the way of cut hands result from changing belts laced or joined by wire or metal clips, and the hasty repair of belts with cemented joints. Next to belts with cemented joints, those laced with rawhide are preferable.

Elevators are another source of danger, especially in some of the older factories which have failed to replace old equipment or keep it in repair. An instance of this kind of neglect occurs to us in the shape of an old elevator in operation in a wood specialty factory. It never boasted of a counterweight in its whole history, and it developed a habit of going right to the bottom of its travel, carrying the stop on the control wire into the reverse position, and starting to ascend again instead of remaining on the level of the basement floor. All loads had to be carefully centred on the car or it would take on an alarming tilt. At other times the cable would slip off the drum and allow the whole car to take a quick drop of about two feet. Such cases as this point to the need for some kind of organization to awaken manufacturers who are so blind to their own interests as to permit such conditions to exist in their plants.

Factory proprietors would be well advised to have a bulletin board and give the particulars of such accidents as may occur from time to time. The reading of such notices would stimulate thought—and thought governs action.

It is only fair to place the blame for accidents where it belongs. If the employer takes every precaution to guard against accident, and the employee is careless or guilty in the contravention of the rules, the latter is open to censure; but where the defence is weak or inadequate the employer should bear the burden.

As far as the workman is concerned, the fact that he bears the brunt and experiences the distressing effects of the accident should make the "Safety First" movement of sufficient interest to arouse his determination to co-operate with his employer at every turn. He should give this movement serious thought, bearing in mind that he is essentially a directing spirit, and that it is from his mind and experience that the most helpful suggestions emanate.

Many accidents may be attributed to the weaknesses of humanity—carelessness, over-confidence, absent-mindedness. Usually they are weaknesses formed by habit, and with earnest effort they can be overcome or at least modified. A careless worker is unsafe: he lacks method, uses no precaution, and is not sensitive to the thought of the consequences of a blunder. An over-confident man may appreciate the danger, but he over-estimates his ability, fails to consider the possibility of a miscalculation, and becomes imbued with the idea that he can perform dangerous operations indefinitely. Take a worker whose faculty of concentration is lamentably deficient: his mind is diverted easily, and in the oblivious state he is liable to expose himself to injury.

Man has eyes to survey conditions and brains to

analyze them. Why not exploit the two natural means of defence? Why do seemingly preventable accidents occur? Is the instinctive trait of self-preservation drifting to decadence, or have the chances of mishaps multiplied? It does not require much of an observer to fathom the actual situation. Accidents cannot be eliminated entirely, but with the co-operation of all concerned the situation can be improved materially.

The aims and efforts of The Woodworkers' Accident Prevention Association, and of all other such bodies, cannot fail to be followed with interest by the various branches of the industry throughout Canada.

The Manufacture of Dry Cooperage in a Large Ontario Plant

As Seen by The Canadian Woodworker on a Visit to the Sutherland Innes Company's Factory at Wallaceburg, Ont.

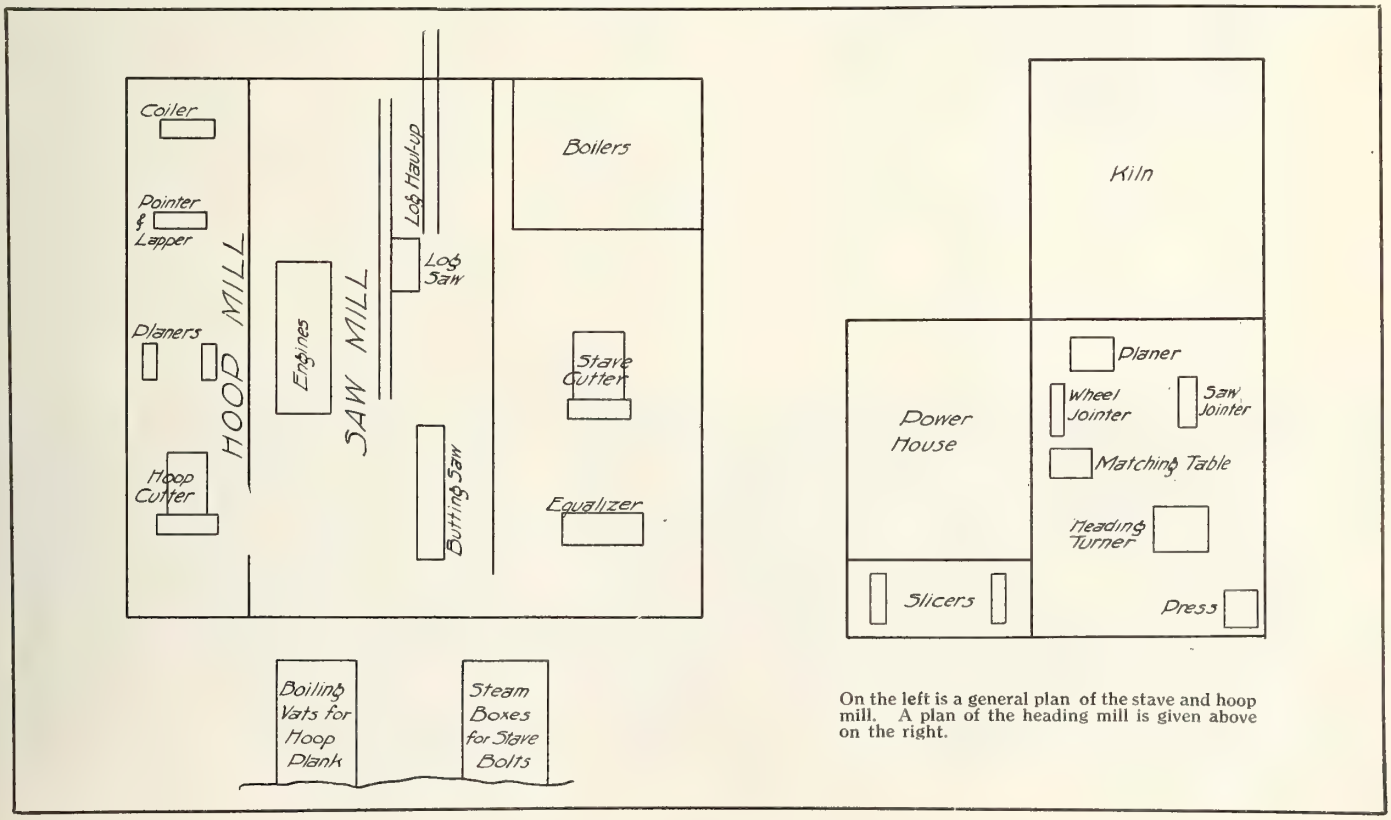
OF the many wheels within wheels in the woodworking industry, one of the most interesting is the cooperage business. It is a singular thing that we hear all too little about this branch of the trade, although we know that it is one of its most useful and practical departments—especially at this time; so that an article descriptive of the machinery and methods employed in the plants of The Sutherland, Innes Company, Limited, of Chatham, Ont., cannot fail to have an educational value for a number of our readers.

The Sutherland, Innes Company is the largest manufacturer of cooperage stock in Canada. Besides having mills at Chatham, Sundridge, Wallaceburg and Smith's Falls, Ont., they have several plants in the States. Their market is world-wide, but naturally the greater portion of their output is used on this continent. They have a branch office with yards and sheds in Liverpool, Eng. These yards have room for large quantities of stock, and generally the foreign market can be supplied more cheaply through the Liverpool house than by direct shipment.

In the first place, it may be observed that the barrel is coming to be regarded as a more sanitary package than the bag, which formerly was always associated with the flour and sugar trades. This recognition is reflected in the increasing consumption of barrels in Canada during the last few years. The flour mills are the largest consumers, rarely taking less than two million barrels a year. The apple packers rank next with a consumption of about one million barrels in a good year.

The principal consumers of the product of The Sutherland, Innes Company are flour mills, sugar refineries and salt manufacturers. Each consumer is supplied from the nearest mill. In this way the advantage of having several plants is apparent in the ability of the company to ship generally from short distances, which makes a saving of freight charges. The apple trade is a large consumer of mill run and No. 2 stock. Flour mills and sugar refineries require No. 1 stock, while No. 2 is good enough for salt, lime, etc. Government statistics are that in a good apple season from one million to fifteen hundred thousand are used in packing the fruit.

Each barrel consists of sixteen or seventeen staves,



On the left is a general plan of the stave and hoop mill. A plan of the heading mill is given above on the right.

Jointing staves in the Wallaceburg yard.

Cutting staves at Chatham. Cut staves are piled on the wagon at the right.

two heads and six or eight hoops, and a separate set of machinery is required for each part. Usually the heading is made in a distinct department known as the heading mill, for the heading bolts are not cut in the saw mill at all. These bolts are generally basswood, poplar and soft maple, and occasionally mixed hard-

Mr. James Innes, General Manager, The Sutherland Innes Co., Ltd.

woods. They come to the mill ready cut to length and are sliced on a circular saw in the same way as shingles are cut. The principal materials for staves are elm, birch, beech and maple, with a certain mount of sycamore. Hoops are made of elm exclusively. As a rule, the mills receive their logs either by water, or by rail, or even direct from the woods on sleighs and wagons. The logs are taken from the woods just as they are felled, and whenever an elm log that looks like good hoop plank is placed on the carriage, the sawyer works it into hoop plank, instead of merely breaking down the log to make flitches for staves. In any case, the logs are dumped into the river, even though they may come in by road or rail. This is done to facilitate getting the logs up into the mill, an operation which is performed by an endless chain, running up an incline from the water. In the Chatham mill the sawing is done on a sixty-inch circular inserted tooth saw with a head rig. The sawmill and carriage are the product of the Waterous Engine Works, Brantford, Ont. From the mill saw both flitches and plank are taken to the butting saw, which is a large swing-saw. Here the stave bolts are cut from the flitches, and the proper lengths of plank for making the hoops are cut out.

Since, essentially, the operation of cutting staves and hoops is similar to that of cutting veneers on a rotary machine, the stave bolts and hoop material must be steamed or boiled before cutting. While most veneer logs are boiled in vats of water, stave bolts are softened sufficiently by steaming in boxes built for the purpose. Hoop material, however, is boiled in the same way as veneer logs. The stave bolts remain in the steam boxes overnight. They are put in after the day's cut has been removed, and are taken out and used the next day. The bark is peeled from the bolts before cutting. As already mentioned, the cutting of staves and hoops is done on the same lines as the peeling of veneer, with this difference: instead of rotating on centres, the bolt is moved up and down on a swinging table past a fixed knife which peels off a stave at every stroke. As the average speed of this machine is one hundred and sixty strokes a minute and up, it can

One of the heading slicers at the Wallaceburg mill.

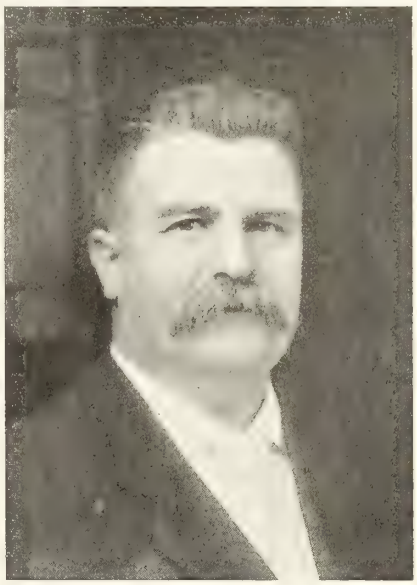
Hoop cutter at work in the Chatham mill—driving gear on the right.

Piling staves for seasoning in the Chatham yard.

A corner of the hoop yard at Chatham.

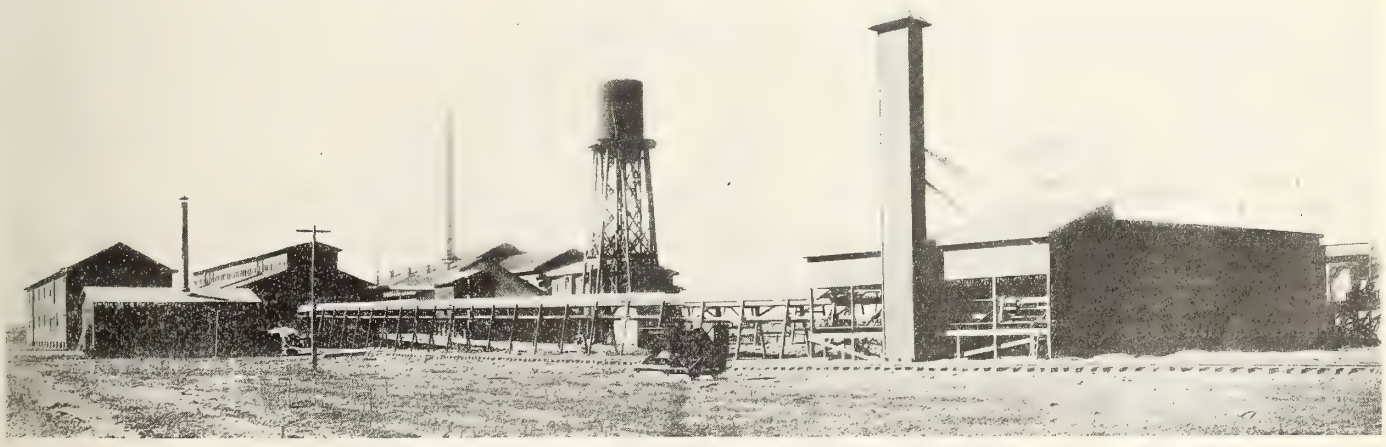
be well understood that it takes a strong man to keep the stave cutter working to capacity. The carriage swings on a centre and does not move straight up and down. Thus a curve is imparted to the stave similar to that of the barrel which it will go to make. Before being cut the stave bolts are equalized between two cross-cut saws running on the same mandrel, which reduces the bolt to the exact length of the required stave. From the cutter the staves are sorted, the cull staves being sent to the fire hole to be used as fuel. The good staves are piled in the open air for seasoning, after which they are jointed and bundled fifty to a bundle, in which form they are delivered to the cooper shop. Before use by the cooper, the staves are put through a kiln to ensure dryness. The hoop cutter works on the same principle as the stave cutter, but it has a special oscillating movement to give the required bevel to the hoops, so that they will fit the shape of the barrel when applied. From the cutter they go to a machine which is known in the cooperage mill as a planer, but which would be designated by a planing mill man as a single head sticker. Following on from the planer, the hoops have to go to a machine known as the pointer and lapper, which, as its name implies, finishes the ends of the hoops for jointing preparatory to the operation of coiling. The hoops have to be boiled once more to render them perfectly flexible. The coiling operation is done on a machine and ten hoops are coiled together and piled out on the yard for seasoning. After seasoning, the hoops are tied up in bundles of ten coils each, making one hundred hoops to the bundle. In this way they are put into stock ready for the coopers.

The heading material comes to the mill in the form of bolts, ready cut to length, and the breaking down



Mr. W. M. Fleming, Secretary-Treasurer, The Sutherland Innes Co., Ltd.

of these bolts is accomplished by means of slicers. At the Wallaceburg plant there are two of these slicers which work on the same principle as the machine used



General view of The Sutherland Innes Company's mill at Kenner, La.

for cutting shingles. The bolt is placed on end on a swing frame and held during the cut by a hand grip. A guide is provided to regulate the thickness of the board cut off at each stroke. Since the saw cuts downwards, practically parallel with the grain, the sawdust comes out in shreds somewhat resembling excelsior. The material produced in this way provides sufficient fuel for the boilers without the use of any coal. In fact, it goes so far towards the fuel supply that much of the waste from the heading turner is sold outside as fuel. The heading boards are sliced off at a thickness of 5/8 ins. and are piled in the yard for seasoning. At the time of The Canadian Woodworker's visit to Wallaceburg there were about two million pieces of heading piled in the yard, which we were informed would supply the needs of the Dominion for more than three months. All the heading is kiln-dried immediately before being worked up. The kiln is of the continuous type and the outlet is into the heading mill, so that the material can be taken right off the kiln car and

Hoop coiling machine in the Chatham mill.

put through the planer without intermediate handling. The heading is jointed with a plain square joint, but the jointer used is not the jointer familiar to the furniture factory or planing mill man. The heading jointer consists of a large disc carrying radial knives, which project slightly through slots in the face of the disc. In operation it is covered with a casing with an opening through which the heading boards are held against the revolving knives. These knives produce an absolutely straight square joint. A small rip saw is provided near the jointer for splitting boards which have defects, such as knots, near the middle. Right back of the jointer is a table, and here the various widths of boards are matched up to make a given size of heading. The circular shape is given to the heading by a special machine known as the turner. The set of heading boards, as matched up, is clamped between two discs on the machine. When clamped the discs are revolved by power and the heading is brought up against a set of special knives which cut right through the boards and trims off the waste, at the same time putting the proper bevel on both sides. The heading is packed twenty sets to the bundle, being squeezed up in a press and tied with wire.

There is still considerable work to be done before the finished barrel is ready for use. After kiln drying, the staves are taken in hand by a man who commences the making up of the barrel by setting up a number of staves in a ring and securing one end of the ring of staves with specially thick wooden hoops, known as truss hoops. It is standard practice to put sixteen or seventeen staves in each barrel. Of course, the staves are in all kinds of widths, so that it requires a little judgment on the part of the man setting up the barrels to take up the right staves without loss of time. The barrel, which at this time has a sort of circular fan-shape appearance—on account of the one end flaring open—is taken to a windlass which draws a wire rope around the flaring end and closes it up so that another truss can be put on to keep it closed. Now the barrel has taken its real shape, and is placed over a special gas heater which sets the staves in their shape and incidentally draws out every particle of moisture. After this firing, as it is called, the trusses are closed down absolutely tight on a power-driven screwpress and the ends are chamfered and crozed for the heading in a kind of lathe. The croze is the groove around the inside of the end which receives the heading. From the crozing machine the barrels roll down a slight incline to another part of the shop where the heading is put in and the hoops driven on. A chain elevator carries the barrels up to the top floor for storage. Any barrels with slightly defective staves are saved for apple barrels.

It is interesting to know that in connection with the cooperage shop The Sutherland, Innes Company have a pair of tight cables stretched across from their store to a flour mill just across the street. Whenever the flour mill requires barrels, it is only necessary to take them to the opening at the end of the stock room and start them rolling down this cable-way. It is necessary to carry considerable stock on account of the widely fluctuating demand. When the apple season comes in the demand is much greater than could be supplied by a shop working even to full capacity, but a stock is accumulated during the slacker months of the year which enables such demands to be met.

The business now carried on by The Sutherland, Innes Company, Limited, was founded nearly a century ago by John Innes at Lybster, Scotland, and the original business is still carried on by his grandson, William Innes. James Innes, Sr., son of John Innes, and S. J. Sutherland commenced in Liverpool as Sutherland-Innes by purchasing the business then carried on by Hatley Hay and S. J. Sutherland, which was extended from Liverpool to Canada and the United States. Shortly after James Innes, Jr., came into the firm it was organized as a company under its present name.

The officers of The Sutherland, Innes Company, Limited are:—Mr. G. P. Scholfield, President; Mr. James Innes, General Manager; and Mr. W. M. Fleming, Secretary-Treasurer. Mr. H. Q. Jackson, is the New York Manager, and Mr. John Sutherland has charge of the branch at Liverpool, England. The company has agents in all the principal cities of Europe, Australia, South Africa, the West Indies and South America.

At their United States mills The Sutherland, Innes Company manufacture veneers, hardwood flooring and other wood specialties, besides cooperage, while the Canadian plants are devoted almost exclusively to the manufacture of cooperage stock.

The Practical and Economic Utility of Wood Waste

Specially contributed by Kenneth McGilvray, Dundas, Ont.

CONSIDERABLE attention has been given for some years back to this very important subject to all who have anything to do with lumber or woodwork, but it really first came to my notice in a particular way some twelve years ago, when in the British West Indies. I was trying some experiments for utilizing the sugar cane after the juice had all been extracted from it, and being a woodworker, it naturally led me on to the utility of wood waste. Millions of cords of wood are wasted in a sense each year—in the forests, mills and factories. This wood, because of its shape, size or quality, it not suitable for the numerous uses for which wood is employed, and any information regarding other means of disposing of this waste is of general interest. Aside from tanning and paper making, which have been established for a long number of years, there are other uses, of more recent origin, which are of importance because they offer a means of utilizing these wastes of the sawmill and the forest. The more important of these are distillation (destructive and non-destructive), recovery of turpentine, rosin and paper pulp, preparation of alcohols and acids. The growth of some of these industries has been rapid in recent years in the United States, and is not due alone to the demand for a method of utilizing the waste woods, such as tops, sawdust, slabs, etc., but also to an increasing demand for wood alcohol, acetates, acetone, turpentine, charcoal, etc., in other industries.

Wastes in any line of business, or in any country, should get a good deal of attention, and we find that the forest services of many of the older countries have felt the necessity of undertaking scientific investigations of such matters, and I may state here that our Dominion Government has also quite lately taken it up. In all places where it has been taken up, it has strongly appealed to those engaged in manufacturing.

The iron and steel, soap and packing industries have very clearly shown that so-called wastes can be turned into a source of profit, but we have grown so accustomed to regarding a very great waste as necessary in lumbering and woodworking, that it is well attention should be called to it, as no doubt the time will come when the wood industry will come into line with the others. The general opinion seems to be that at least 60 per cent. of the actual wood in the tree is wasted in transforming the same to sawn lumber, about 35 per cent. being lost at the mills in the form of sawdust, slabs, edgings, and shavings, and 25 per cent remaining in the forest in the form of tree tops, branches, stumps, etc., which usually make and help to feed those forest fires we hear of every summer. Then we have many fine trees left (especially of certain species) to the fires and winds, because it is thought that they do not furnish wood suitable for the needs of commerce. It is not long ago that in the United States, red gum was considered worthless, because it could not be seasoned without serious warping and checking. I remember distinctly the first large shipment sent to Great Britain, of this wood, but the trade has already grown to large dimensions. Tupelo gum was ignored for the same reasons. Western larch and hemlock and loblolly pine were not often used in the United States, because they were not as strong and durable as longleaf pine, and in the Southern States could not be sold, because it was thought they were not as good as the hardwoods of the Ohio Valley. Such cases are rapidly becoming fewer in number, but even yet the forests in all parts of Canada and the United States contain splendid trees that are left to the fires and winds, ostracized from the woods of commerce, because in the stress of business competition no one has had time to determine whether or not it is practicable to use them. If we go further into the waste question (although on account of space I will leave these parts out of this paper) we discover that after wood is put into service, its period of use-

Mr. Kenneth McGilvray.

fulness is greatly diminished because it is not properly protected against organisms which destroy it, such as decay producing fungi, insects and marine borers.

The chief retarding influence in treating all the wood wastes, is that in spite of the great quantities, the inherent value of the raw material is relatively small. The economic value of the finished products which can be manufactured from wood waste is in many cases not very great and the cost of transportation and the treatment of the wood is often prohibitive. The methods of utilizing it differ rather widely in principle and in scope, and there are also limitations in treating any one species of wood. The various associations of lumbermen have done much to make an asset of many forms of waste wood, mostly along the lines of using up small pieces produced by the mills which can be used to advantage by other mills, which do not require that their saw material be in large sized sticks.

Box factories, spool manufacturers, toy makers and factories making such articles as hammer handles, etc., are frequently able to use the various odd pieces, but the vast quantities of shavings, sawdust, cuttings, and

edgings mostly go to waste, or are burnt, and it is to these that most of the chemists of the world are paying attention, since chemical utilization seems to be the most promising field in this connection, I will have to treat very briefly, without going into many of the details of the results or methods mentioned later on in this paper, owing to lack of space, but while all of them are said to be successful (that is, profitable), it should be recognized from the start that what is successful in one locality would prove a complete failure in another, and would require careful preliminary investigation.

Wood is a fibrous material, the fibres of which are composed of cellulose and lignin. When the fibres are separated they are valuable for the manufacture of paper, fibre board, and other fibrous materials. It has also been demonstrated that cellulose can be converted into fermentable sugars from which alcohol can be made. Cattle food, wood alcohol, acetate of lime, artificial silk and many other products also have been made from cellulose in other countries. Destructive distillation of wood is an old and important industry and well developed in Germany, Russia, Norway and Sweden, and less extensively in France and England.

The distillation of hardwood to produce charcoal, acetate of lime, tar and wood alcohol, etc., is a pretty stable industry in the United States, and in some parts of Canada. We have a constantly growing demand and market for charcoal in Canada, and with good prices for the supply, it is advisable to increase the production. While the retort is undoubtedly the more economical means of producing charcoal, the old style charcoal pit can still be used, as the advantage is offset by the fact that the wood which would be utilized in the production by pit burning would otherwise be waste material and the returns from its use would offset the additional cost of production by the latter method, which is a very simple process. With very little more outlay, the tar can also be caught by the pit method. Almost any pieces of hardwood under two feet in length are suitable, but for various reasons, sawdust and shavings are not suitable for charcoal. For pit burning it is essential to have a piece of land sheltered from the wind as much as possible. Sufficient wood should be provided for two pits. It is advisable to burn two pits at once, as two can be attended to as readily as one, night and day attention being required. They are usually built 21 feet in diameter and about 9 feet high, and when the wood is all built in, it is covered with newly-cut sod, the grassy side upwards. The time required for burning varies from seven to nine days, according to weather conditions. When the pits have burned out and become cool, their size will be reduced to somewhat less than half the original, and the charcoal should then be stored in a dry place, care being taken to see that no live embers are left. As it is only 25 per cent. as heavy as the wood from which it is made, it has advantages as a fuel, owing to lower transport charges. It is also used for insulating cold storage plants, and as a disinfectant, etc.

Potash and Wood Ashes.—The fact that the Government at Ottawa is casting about for ways and means to replenish the potash supply, the source of which before the war had been the Stassfurt Mines, Germany, should be interesting to us, as we are told by old-timers that during the early settlement of Canada, and up to within fifty years ago, potash was the main revenue producer, and on the sale of this commodity, the early settler relied as his chief source of income. He thought himself very fortunate should he be able to locate a homestead with plenty of elm, ash, maple and basswood, for these woods were always considered the best for yielding ashes of good quality and rich in potash. The prices paid then in Montreal, the chief market place, were on an average for potash from $150 to $175 per ton, and for pearlash $165 to $180 per ton. The cost of erecting a potashery was about $150. There were also potash factories, the proprietor buying the ashes of his neighbors and making potash at a central point. Practically all the potash made in Canada was for export, and after the great potash beds in Germany were found and potash salts could be procured cheaply, the industry quickly went to pieces in Canada. Germany now controls the supply, her exports being said to amount to 6,600,000 tons annually, valued at $35,000,000, or about $5.35 per ton at pit mouth. About 1890 an export tax was put on against the American fertilizer companies which lead to tariff reprisals by the United States against Germany. Potash is used in the making of glass, gunpowder, fertilizer, crockery and other things. Last year Canada imported over $1,000,000 worth, and now, with the supply cut off entirely, a new source is looked for. Two sources are available, one by obtaining it from feldspar, which is expensive, the other by making it from wood ashes. It is reported that the Parks Branch at Ottawa, contemplate burning all the dead wood, etc., and no doubt they will fall back on the same methods used about a century ago to produce potash, but it can only be gone on with until the war is over and trade with Germany resumed. The Department of Agriculture says that the local wood-ash is worth 1 cent per pound more than the salts imported from Germany. Then we have a good amount of wood ashes wasted and apart from the difficulty of securing potash supplies, the market value of ashes was given lately at from $8 to $12 per ton, depending on quality, and demand. Anyone burning a quantity of wood may find this an asset.

Pulp and Paper.—There are many patents out within the last few years in nearly all countries, chiefly for extracting oils, alcohol, turpentine, rosin, etc., from waste and other woods before making it into pulp. Most of these industries require a large and constant supply of raw material, expert technical supervision, and frequently a big outlay of capital for expensive equipment. The market also has to be considered, particularly in its relation to the locality in which the raw material is found. Almost every kind of wood has been proved suitable for the manufacture of some form of paper and fibre board, but there are considerations affecting the use of each kind which must be observed. Most of the pulp now made in Canada is from spruce and one or two other woods, cut for the purpose, but there are many others which will be found suitable for making pulp on a paying scale. Better methods and less waste will enable Canada to be the leading pulp and paper country in the world. The Dominion Government is at present erecting and equipping pulp and paper machinery in the Forest Products Laboratory, McGill University, Montreal, where special attention will be given to methods of manufacturing a commercial pulp from woods at present being wasted. Provided that the waste wood is reasonably free from dirt, knots, and bark, or that these can be easily removed from it, a good pulp can be made, but sawdust is an exception, owing mainly to the short fibres. There are several mills in the United States using at present mill slabs,

shavings and other forms of waste more or less entirely. Cheapness and quantity are the advantages of waste wood, but against it are, that it is usually green, full of water, and comes in irregular shapes. Shavings are better for the purpose, and if in sufficient quantity, make very good raw material. Woods of different species must be kept separate, as some woods, such as pine, contain a large percentage of resin and require a different treatment. The process will depend chiefly on the raw material at hand, and on the market for any particular variety of pulp. To make the treatment of the more resinous classes of pine waste profitable, attention must be given to by-products. Rosin and turpentine may be first removed, and it is claimed that the spent pulping liquors may be evaporated and distilled to yield rosin, spirits, acids, tar, etc. There are two processes in pulpmaking. The soda process depends on the decomposition and solution of the lignin by a caustic soda liquor at high temperature and pressure, but of more significance is the sulphate process. The presence of the sodium sulphide improves the color of the pulp, and simplifies bleaching, at the same time the fibre is smoother and firmer, and imparts better wearing qualities to the paper.

Mr. John S. Bates, A. B. B.Sc., Chem. E., now superintendent of the Forest Products Laboratories, McGill University, Montreal (whom I have to thank for information and useful suggestions for this essay), has written a very interesting dissertation on the "Chemical Utilization of Southern Pine (longleaf) Waste," in which he gives the results of many very interesting experiments with this class of wood waste.

Ethyl Alcohol.—Another product which may be prepared by chemical treatment of wood, preferably sawdust, is ethyl alcohol. This is distinct from methyl (or wood) alcohol, which is produced by destructive distillation. This alcohol is not poisonous in the same way as wood alcohol and a broad market is open for it, if it is produced sufficiently cheap. Since the wood used must be finely divided, almost any kind of wood waste can be reduced to the size to suit. It is made by treating the wood with sulphurous acid, thus partly converting it into fermentable sugar, which is fermented and distilled. The alcohol produced is said to be in every way suitable for industrial purposes. A yield of 25 gallons per long ton of sawdust is claimed for this process. The process is on a paying basis in Europe and in at least one plant in America. The United States Laboratories have taken up this industry and look forward to it becoming a commercial success. A study of the motor fuel problem shows that the mineral fuels (gasoline, etc.) are not keeping pace with the auto production. Alcohol appears to be the only solution of the problem, for if it can be produced from wood waste at a reasonable figure, a tremendous supply of raw material is available.

Classes of wood	Charcoal (Bushels
Hard woods	40 to 50
Resinous woods	25 to 40
Sawdust (hardwood)	25 to 35

Oxalic Acid.—Oxalic acid can be made from sawdust, or from any species of wood finely ground, and should be very profitable if a large enough market can be found. Canada uses very little of this acid, but the United States imports a fair quantity. A very little wood used in this way would produce all the oxalic acid used in this country. The sawdust is mixed with caustic soda, which forms sodium oxalate, from which the acid is easily produced.

Producer Gas.—Several forms of apparatus for the production of producer gas from waste wood have been put on the market lately, and are finding considerable favor in certain cases. The production of power from waste wood in this way is much more economical than burning the wood under steam boilers, especially when small sized stuff, as shavings, sawdust, etc., is to be disposed of. Any kind of wood can be used, though it is an advantage to have it of fairly uniform size and dry if possible.

The different processes of which I have given brief statements prepare from wood wastes compounds which are articles of commerce. The United States Department of Agriculture some few years ago, giving the average yields of well-operated plants and valuing the products at current wholesale prices, valued the yield of one cord of wood as follows:—

Hardwood	—destructively distilled	$11.00
Pine	—good light wood	20.00
Pine	—good steam distilled	7.00
Pine	—extracted with soda, soda pulp made	44.00
Pine	—extracted with volatile solvents and pulp made from residue	46.00
Pine	—extracted with solvent and residue destructively distilled	26.00

It must be fully understood that these are only approximate gross values, as yields at the different plants vary widely, above and below those given. The several products were priced as follows:—Charcoal, 4c. per bushel; 80 per cent. alcohol, 30c. per gallon; turpentine, 60c. per gallon; rosin, $4 per bbl.; tar, $6 per bbl.; gray acetate, $2.50 per 100 lbs.; unbleached soda pulp, 2c. per lb. From these gross values, many fixed charges must be deducted, but it would take too much space to go into these in this essay.

In the distillation of different woods the average amount of products yielded per cord of wood are:—

Crude Alcohol (gallons)	Acetate of Lime (pounds)	Tar (gallons)	Wood Oils (gallons)	Turpentine (gallons)
8 to 12	150 to 200	8 to 20		
2 to 4	50 to 100	30 to 60	30 to 60	12 to 25
2 to 4	45 to 75			2 to 10

The low yield of sawdust is probably explained by the packing of the material in the retorts, when complete decomposition is rarely obtained. As far as can be learned, no satisfactory process has yet been devised for distilling sawdust.

The waste from the hardwood lumber industry would yield more charcoal, wood alcohol, and acetate of lime than is now being produced. The spruce and hemlock waste will yield at least one-half of the sulphite pulp now produced. It is still an open question if these industries can be more profitably conducted in conjunction with the lumber industry, or independently, but if the latter, they must be in close affiliation with the lumber industry.

At a recent meeting of the Chamber of Commerce in Montreal, Mr. Leon Lorrain said that Canada's fire loss was relatively the biggest in the world. In five cities of Canada, with a total population of 957,372, the speaker said, the loss per capita for the year 1912 was $2.88, as against $2.55 in 300 American cities, 54 cents in cities of England, 84 cents in France, 20 cents in Germany, 30 cents in Austria, and 90 cents in Italy. In 1914 the fire loss in Canada was $3.15 a head.

Waste Power—Its Cause and Correction

One of the Fundamentals of Keeping Down Expense in the Factory —A Few General Rules for the Superintendent and Foreman.

Submitted by H. E. Rorke, Clinton, Ont., in The Canadian Woodworker Essay Contest

FOREMOST among the various problems that must be solved by every factory owner or manager is that of "keeping down expense." This problem, so varying in its nature, must be considered from a number of different view-points.

Some managers may look principally to the "pay-roll," and from time to time may endeavor to effect a reduction there. Others may devote their attention to purchasing the different kinds of "raw material" at the lowest possible price consistent with the desired quality of the product. Others again may find in some other direction an opportunity to exercise economy. In the title of this essay will be found an item of expense which though, perhaps not wholly overlooked by any, may in a very few cases receive the amount of consideration the case demands.

Let the manager or owner of any of our large wood-

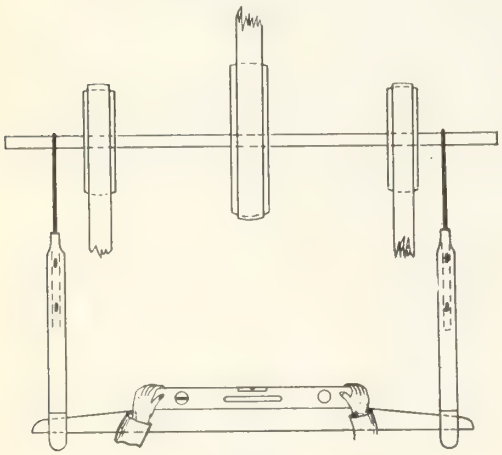


FIG. 1.

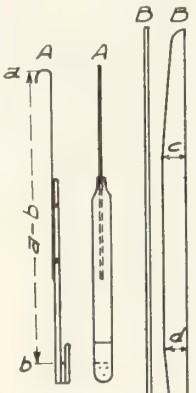


FIG. 2

FIG. 3.

working plants draw a mental picture of his engineer or stoker feeding the furnace with "bank notes." Quite absurd! I hear someone exclaim. And yet after all, is the idea quite as absurd as it may at first appear, when we take into consideration the fact that every square inch of waste material has a money value, and if not consumed in the factory furnace can be disposed of for domestic fuel in city or town? That every shovel-full of coal represents its equivalent in "coin of the realm," and that every kilowatt-hour recorded on the hydro meter must be paid for in "currency," then the picture does not seem so absurd and the problem of economizing power becomes a "burning question" in more than one sense.

We can safely assume that in ninety per cent. of our big manufacturing plants there is a greater or less amount of power wasted in unnecessary friction. In some cases perhaps the engine may not be running just as smooth as it should. Oftener, perhaps, some of the machines may need attention. Oftener still, the main shafting may be out of line and grinding at every bearing. And it is this cause of waste power we wish particularly to deal with in this article. A good engineer will see that there is no fault with his engine. A careful foreman and intelligent machine operators can generally be depended upon to keep their machines in good running order, but keeping the "Main Shaft" in proper shape is a much more difficult problem and one less likely to receive consideration, mainly, because it cannot be attended to when the factory is in operation.

We will assume that in every wood-working factory the main shafting was installed correctly. (Only grossly incompetent mechanics would install one otherwise). But for various reasons this correct alignment may soon be disturbed, and an immense amount of friction thus caused. In most factories the main shaft is hung to one or other of the ceilings by means of short planks being bolted to the joists, the shaft hangers in turn being bolted to these. The bolt holes in shaft hangers being "slotted" to allow for adjustment, is in many cases a reason for that adjustment becoming disturbed. An overtight belt may pull so strongly as to shift a hanger. This shifting may be so slight as to be almost imperceptible, but little by little the shaft will be drawn out of line and begin to "grind" in the bearings. This is perhaps the most frequent cause of a shaft getting out of line. Another cause may be found in the timbers of the building shifting by reason of warping and shrinking which not infrequently happens.

A shaft may become unlevel also from various causes. A strong "belt pull," either upwards or downwards, along with the constant jar, may cause set screws to shift. The floor to which shaft is hung may sag in places on account of a weight of stock being piled on the floor above the shaft, and this may vary from time to time as stock may be shifted. It would be advisable, therefore, to avoid as much as possible heavy piling of stock directly above the shaft.

Granted that in ninety per cent. or more factories these causes of crooked shafting exist and that a very considerable amount of paper is wasted by the friction thus caused, it will be apparent to all managers or superintendents that the main shaft should receive frequent attention.

To the superintendent or foreman "responsible" for the machinery and shafting in the many large manufacturing plants a few general rules for lining and levelling shafting may be of interest.

To put shaft in line, fasten two strips of wood (one at each extreme end of shaft) to joists or other convenient timber, strips to be of sufficient length as to extend below the circumference of the largest pulleys. Plumb these strips to touch lightly one side of the shaft, attach a fine line to the lower end of one strip, drawing around the edge touching shaft. Drawing "tight" as the line will stand, pass along entire length of shaft and attach to strip at other end. Drop a plumb bob attached to a fine line over the shaft letting it fall below the running line and on same side of shaft as strips are touching. If plumb line when "quiet" is found to hang away from running line, adjust hanger either by means of slotted bolt holes or by set screws at sides which will be found on most all shaft hangers, bringing it to the line. Fasten bolts or

set screws firmly, pass on to next hanger and repeat the operation and proceed thus along whole length of shaft.

The levelling process is more difficult. An ordinary spirit level will not suffice as pulleys are generally too close together to allow its free application and owing to the short amount of shaft that can be tried by each application, it is quite inadequate for the work. An excellent device for this purpose will be found in the accompanying sketch of hook hangers bar and level, as shown in Fig. 1. To construct hangers, procure two pieces of ¾-in. or ½-in. round iron about 2 ft. long. Have blacksmith turn a hook on one end of each and flatten the other end. In the flattened part have two screw holes "slotted" to allow for adjustment. Attach these to pieces of basswood or other available timber say 3 ft. x 3 ins. x ¾ in. dia. To the other end of these fasten two short pieces of equal width and thickness, the outer one being longer than the centre one, thus forming a socket as shown in Fig. 2. To construct bar, select a good straight grain piece of some light material thoroughly kiln dried, cut 6 ft. to 8 ft. in length as desired, finish 4 ins. x ¾ in., taper and round ends as shown in Fig. 3. Be **sure** the hangers A. measure exactly the same between points a and b as indicated in Fig. 2. Be **sure** that bar B is perfectly **straight** and of exactly same width between points c and d as indicated in Fig. 3.

It will be readily seen that this device can be applied to the shaft any place where there is ½ in. or more of space between pulleys.

Begin operations close to drive pulley. Hook hangers over shaft, drop bar into sockets and apply the level as shown in Fig. 1. Raise or lower as required by adjusting set screws under bearings with which all shaft hangers should be equipped. Proceed thus along entire length of shaft. A shaft perfectly level and in line should be easily turned with the hand, provided belts are all on loose pulleys and the drive belt slackened.

Before beginning operations it would be advisable to test this device. Select an open place in shaft where it can be levelled with spirit level. Apply the device to the shaft as before directed, then reverse the hangers and try again. If any variation is shown shift the iron rod on one hanger by means of slotted screw holes; continue trying until it shows the same on the level both ways.

There are other causes of waste power which space will not permit of consideration in this article, but which might be taken up at some future time.

In a report of the Trade Commissioner of Great Britain, it is stated that all kinds of machinery was imported from Belgium, Germany and other continental countries. It is pointed out in the report that with the cessation of the import of such machinery, a more favorable market presents itself to Canadian firms making specialties likely to appeal to the markets of Great Britain. In the making of woodworking machinery, Canadian makers have had considerable experience, and with their practice and frequent improvements made, should be able to offer machines equal to, if not better than, those from other sources.

The recent sale of Manitoba debentures at 98.85 is the best possible evidence of the soundness of the financial position of the province, and indisputable proof of the faith of financiers in the stability of its institutions.

The Adam Design in Furniture

Submitted by R. Ferguson, Toronto, in The Canadian Woodworker Essay Contest

THE style of design known as Adam is one of great interest to people in this country. The style was established in the eighteenth century by two brothers, Robert and James Adam. The former of these architects appears to have controlled the business, and it is due chiefly to him that the style came into vogue. Their father, William Adam, of Maryburgh, near Kirkcaldy, in Scotland, designed a large number of buildings there, and was appointed master mason in Scotland. It is certainly curious that of all the great English furniture designers, Robert Adam was the only one who successfully practised as an architect. A large number of buildings in London still testify to his skill in this direction. Indeed, it was chiefly as an architect that Robert Adam built up his reputation. Contrary to the usual custom of the leading designers of his time, he did not manufacture his productions under his own personal supervision, like Heppelwhite and Chippendale, a large amount being produced for him by the firm of Gillow, contemporary workers in London, and then the sole survivors of the great eighteenth century designers. The period that most influenced his work was undoubtedly classic, the result of a visit to Rome in 1756, during which time he carefully studied the ancient buildings and ornament there, returning with a mass of drawings and detail that proved the basis of his work. The particular manner of his designing continued throughout his career, although it is doubtful whether such an indiscriminate use of classic ornament was proper; even carpets, fireplaces, and candelabra were ornamented with precisely the same details as parts of buildings and furniture. He excelled in proportion and delicacy of treatment, which, with the rich appearance of his carved work, gives this style such charm. Various class details were drawn upon for the enrichment of his work, of which the following may be mentioned as characteristic detail, viz.: festoons of flowers, swags of drapery and husks, rams' heads, fauns, elliptic and lozenge-shaped panels, paterae, lion-shaped ornaments, human figures, birds, animals, floral decoration and drapery, tapered legs with reeded and fluted shafts, and knee parts decorated with water-leaf carving were largely used. His carved work was particularly graceful and refined in character. It projected but slightly from the groundwork, cut in low relief, and this treatment accounts in a large measure for the delicate appearance of his work —whether a stucco decorated ceiling, panelled wall, metal fitting, or household furniture. Elliptic paterae or rosettes filled with a rayed device in pendant form, wreaths, garlands of flowers, and ribbon detail were all employed by him.

Mahogany was the material chiefly used by Robert Adam for furniture, although pine was used to a large extent for chimney pieces and door framings, which were afterwards painted. Chimney pieces were also made of statuary marble, eminently suited to his style of decoration. Elaborate wall and ceiling decorations were executed in stucco, a fine plaster-like substance introduced into Britain by the brothers Adam. The ornament was cast in moulds with a mixture of whiting, linseed oil, resin and glue in certain proportions. This composition has the advantage of being easily rendered pliable by laying in a shallow pan of hot water, and, when glued and primed to the stucco

groundwork and allowed to dry, forms a permanent ornament. To decorate their furniture and interiors the brothers Adam employed famous Italian artists who excelled in the painting of all kinds of figures, etc. In addition to this decorated work, a large number of gilt chairs, overmantels and girandoles were executed. Pedestal sideboards with urns or vase knife-boxes placed upon them are also a feature of this period. The metal work, handles, fittings and mounts were of ormulu, a metallic substance composed of brass and zinc made to resemble gold, and often "water-gilt."

Suggestions for Band Sawyers

IN many factories, the breakage of band saws may be reduced fully fifty per cent. by a little care along certain lines, says a writer in The Woodworker. A fertile cause of breakage is poor filing. Some of the teeth are left longer than others, and whenever that part of the saw touches the wood the projecting tooth makes an increased strain on some part of the saw, and this strain is repeated every time the saw revolves. The part thus strained gradually becomes weakened and finally breaks.

Of course, some men can file much better than others, but no man can file as well as a good, reliable filing machine. With it, every tooth is the same size and shape. A man may vary or make mistakes, but a machine can do neither. In that respect, it is superior to man; and in the same respect, it is inferior to man, because it must follow the line set by man. Set the machine right, start it right, and it will continue right.

Band saws are often broken by starting the machine too quickly. Many circular saws, as well as other machines, are put in motion by a lever on the floor which can be moved with the foot; the operator gives this a quick shove and the belt is suddenly shifted. The strain thus put upon a circular saw, from centre to circumference, is so great that if we actually comprehended it we should wonder that the saw did not go to pieces; and the flapping of the belt will give an idea of the strain upon a band saw when thus started. This quick starting is also responsible for many of the accidents resulting from emery wheels going to pieces.

The proper way to start any machine is to draw the lever slowly. In starting a band saw, set it in motion by turning the upper drive with one hand while slowly drawing out the slide with the other. Band saws are bound to break in time, no matter how good the material of which they are made, and no matter how carefully they are handled. But the observance of a few rules will reduce the number of breaks considerably.

The Possibilities of Elm

There has never been enough effort to develop the possibilities of good elm in cabinet work and interior trim, complains a writer in The Hardwood Record. Elm has been extensively used in the furniture trade for many years, but generally in the making of cheap furniture in which no effort is made to finish it so as to bring out the native beauty of the elm. Usually the efforts to finish consist of using a heavy paint-like stain so as to make it look as nearly as practical like oak or something else. Now and then one comes across an instance where some one has made good use of elm in a piece of furniture, where it is properly finished off. Also one now and then finds it used with the same care and appreciation in house trim. These instances are rare, however, and as a general thing there is but little appreciation of the possibilities of elm for face work. Right now there should be a splendid opportunity to develop the use of good elm. Popular taste is turning toward the softer tones in brown and gray, and here elm should enter readily. It has no distinctive figure but it has a soft color. Some gray elm when polished and finished as it should be presents a beautiful appearance and the red elm properly finished should find favor along with the softer tones in brown. It is a wood that has strength and body and will take a good finish, and something more should be made of it than just a material to use for cheap furniture. Elm has possibilities if it were but given anything like the attention and finish that is bestowed upon other woods, and then properly exploited.

Machinery for Shrapnel and Ammunition Cases

MANY of the specifications for shrapnel and ammunition cases call for a wedge dovetail corner, using ¾-in. sides and ends, and having the pins placed 1-in. from centre to centre. Other specifications call for a dressed 1 in. side and end, using screws in place of nails and having a metal band drawn around the corner and lapping over the top of the box. Both call for screws for putting on the tops and bottoms. The wedge dovetail construction is the cheapest if made with machines that will make a tight fit of pins and grooves, so that glue can be dispensed with.

A wedge dovetailer operated by two men will cut enough sides and ends to make up four hundred boxes an hour. The fit of the pins and grooves should be made tight, so as to get a box corner as strong without glue as with it. A sufficiently powerful squeezer operated by a man and a boy, with a four saw trimmer operated by one boy, will handle four hundred boxes an hour. This means that a crew of five can dovetail, squeeze and trim four hundred boxes an hour of shrapnel case size. The cost will be far less than if put together with screws, and the boxes will be much stronger. If a metal band is required to protect the corners and help hold on the bottoms, it can be put on a wedge dovetail corner as well as any other.

Glue is required only on the wedge dovetail construction where a tight fit of pins and grooves cannot be made. Based on an output of four hundred boxes an hour, the glue and extra labor would cost at least $1,000 a year. Machinery that will make glue unnecessary will save the box-maker this added cost.

Where the wedge dovetail cut is made by a number of circular saws the thickness of the side that can be handled depends on the thickness of the saw used and the spacing from centre to centre of pins. For ordinary boxes where the sides range from ¼ in. to ⅝ in. the saws are 5/32 in. thick, spaced ½ in. from centre to centre. Where shrapnel case specifications call for ¾ in. sides with pins spaced 1 in. from centre to centre, a ¼ in. saw should be used. This will also handle 1 in. dressed lumber. Machines fitted especially for shrapnel cases can be readily refitted for ordinary box work, and show excellent economy in ordinary box making.

The St. Paul Manufacturing Company, St. Paul, Minn., make a wedge dovetail machine for this class of work.

QUESTION BOX

A Practical Department of Reference for the Practical Man

The Shavings Problem

Q.—"We have read with interest the article in your paper concerning chemical use of wood waste and it seems to us that the process described, as well as most other chemical processes, requires too much of an installation to pay unless the quantity of waste at hand be larger than is generally available in the medium sized plants. Shavings seem to be our greatest problem, as during the summer months we have always had to let them go to the burner or run the boilers blowing off nights to get rid of the surplus. We bale some, but the market for them in this form is too limited to amount to much."

A.—Your problem is the same as the rest of us have to contend with, although local conditions modify the situation to some extent. Probably after all we are looking too far away for the solution to the problem, and some more commonplace use for the waste would be better in medium sized plants. Briqueting is practised to a certain extent, and by using some cheap material like tar or molasses, or heating before pressing so as to exude some of the resinous matter in the shavings, for a binder this form of waste can be reduced in volume so as to enable one to store and ship it to a suitable market. There is always a lot of waste heat around the flue in a power plant and this can well be used to heat up the material, without any outlay for fuel. Without doubt wood waste, if one can burn it under boilers, gives as good a return as can be expected at the present time, the main difficulty being that there is some which it is impracticable to use in this way, and this is the source of all the discussion.

Every manufacturer of lumber requires a considerable number of teams to serve the mill, deliver the product, etc., and the motor truck for this purpose is admittedly the cheapest form of transportation, at least during the summer months, usually the busiest season and also the time when shavings are the most troublesome. If you could turn that extra shavings into power for the trucks, you would certainly be ahead, and this you can without a doubt accomplish. If you will write the Couple Gear Freight Wheel Company, of Grand Rapids, Mich., you will find that they have developed the electrical end of the machine to a satisfactory conclusion, at least as far as the lumber industry is concerned, and it only remains to install a small engine and generator suitable for charging batteries for the electric trucks which will replace most of your horses. Then you can have your night watchman look after the charging of the batteries for the next day, utilizing your waste shavings for fuel. Electric trucks are the cheapest form of vehicle from any point of view, even when you have to buy power, and with the power for practically nothing, it is certainly a proposition which no lumber manufacturer can afford to overlook. If you still have surplus shavings, they can be briquetted and either stored for fuel in the winter or sold as fuel for stoves, according to your location and market.

Improving One's Position

Q.—"Some time ago, you gave me some advice on how I might best advance myself in my trade, and this I have followed to such good purpose that I am now doing about twice as much work as formerly, without, however, any increase in pay, even though I have asked for it. Please advise me what the next move is."

A.—What you say indicates pretty clearly that you have followed instructions, and that your actual reward is not forthcoming is not your fault. You must remember that the business man has had some pretty hard sledding during the past year, and that any hint of increased expenses would necessarily be distasteful to him. It is unfortunate that some employers do not look farther ahead with their ambitious men and pay them what they are actually worth, for increases which are made as direct reward for some saving to the company are not properly classed with increased expenses, and no company loses by this kind of an investment. The best thing you can do is to keep on as you are going, and do everything you can to help out during this tight period, then make your request again. If it is not granted look for someone else who is not so short-sighted, remembering that any man who has intelligence and ambition enough to look for and carry increased responsibility can always find people who are willing to pay him at least part of what he thinks he is worth.

Factory Lighting

Q.—"It is going to be necessary for us to remodel our lighting system this summer, and for our general information we wish to put the following questions to your Question Department, the answers to which will assist us very materially in the planning and execution of our system if you will be kind enough to secure them for us."

1. What size of lamps should be used from a ceiling thirteen feet high?
2. How many are required in each bay sixteen feet by sixteen feet?
3. How far from the ceiling should they be suspended?
4. Should they be in groups on switches, or handled with individual key sockets?
5. What form of light is best suited to the yard?
6. What form of current is best, A. C. or D. C.?
7. How should the size of the generator be determined?
8. Where should the generator be placed?

A.—For lighting from a ceiling thirteen feet high, 40 watt tungsten lamps are sufficient and will give an illumination on the floor which will bring all objects into good light. One lamp per bay of sixteen feet square is sufficient, provided they are placed regularly throughout the mill so as to eliminate the shadows. They should be hung from the ceiling about eighteen inches and should be in keyless sockets soldered to the wire. Grouping is a large subject, and

one which cannot be handled without intimate knowledge of the work to be lighted. In general, however, the lamps should be grouped, allowing five or six to a switch, so arranged if possible as to cover some definite series of operations which might be expected to go on at the same time, thus allowing that work to be illuminated amply, while no light would be wasted on an adjacent part of the mill which might not be in operation at the time. Also, it is a good plan to have the bays around the outside of the mill controlled separately from the inside ones, so that they may be turned on last and off first, so as to make as much use of the daylight as possible. There are always machines which require close individual lighting and these should be provided with extension cords and carbon lamps, protected by guards, and also provided with key sockets, so that they may be turned off and the general illumination used as much as possible. Machines that require considerable setting at all times of the day, like planers, matchers, stickers, moulders, etc., should be provided with one of these lamps which can be taken close to the work. Where necessary, these lamps can be supplied by a third wire running beside the two group wires, utilizing one of the latter and one of the fuses for a return, it being possible in this way always to have light on the extensions, while the group of lamps are dead. In yard lighting, the lamp should be swung as high as may be necessary to illuminate the desired area, generally fifteen feet being sufficient. The lamps should be of about three hundred candle power, either tungsten or the new nitrogen filled type, the latter being especially efficient for this kind of work. Alternating current is by all means the best and most economical. The size of the generator is also an open question, but may be roughly determined by adding together the current required by all the lamps installed and contemplated and multiplying it by two. Don't get the generator too small, or nothing but trouble will result.

The Use of Coated Nails

Q.—"We have installed a nailing machine in our packing department to nail up shooks and put the covers on to the boxes after they are packed, and are having considerable trouble with the slides, as they get gummed up from contact with the cement coated nails and will not feed the nails properly. Of course, we can use plain nails and are doing this temporarily, but wish to secure the advantage of the greater holding power of the cement-coated nails. We know others drive cement-coated nails with machines, and perhaps you can put us in touch with someone who can tell us what to do."

A.—The remedy is very simple and inexpensive. All you have to do is to buy a fifty pound bag of French chalk and dust a small amount in the box from which you fill the nail hopper of your machine. This will work over all the nails and prevent them from sticking to each other and to the slides, and will eliminate all trouble in connection with coated nails.

A Mill Repair Shop

Q.—"What would be your idea of the proper equipment for a repair department for a large lumber mill, located at some distance from any large centre, and employing about five hundred men. Also about what space would be required, and would it be advisable to combine the saw and knife work in the same department?"

A.—A repair department for a mill of this size is quite an important part of the organization and must contain the tools which will enable prompt attention to be given to the various maintenance and emergency jobs which crop up in any active business of this kind. Also, some construction jobs in which it is necessary to make special outfits are bound to turn up, and the money saved in labor by being able to make suitable changes in existing machinery promptly is often enough to more than pay for the whole repair department. It would certainly be a mistake to combine the filing and cutter work under one head, for the filing requires a specialist and possibly an assistant all of his time. Moreover these men are usually highly paid men who do not take kindly to the dominance of any but the superintendent. Generally, knife work is a specialty also, and is looked after by the planer or sticker man himself. It is best located close to the machines served, so that nothing is gained by placing this work in the repair department, although sometimes the knife and saw work can be looked after by the filer if you have the right kind of a man.

The equipment of a repair shop should include as main units:—

1 Four-foot gap lathe.
1 16-in. toolmaker's lathe with compound slide.
1 24-in. drill press.
1 Sensitive drill press.
1 24-in. planer.
1 Forge and anvil with blacksmith's tools.
1 Heavy combination vise that will handle pipe.
1 Light swivel toolmaker's vise.
1 Full set of standard dies and taps, including a ¾-in. left-hand screw plate and tap.
1 Oxy-acetylene welding outfit (high pressure).
1 Ratchet drill and clamp.
1 Chain pipe wrench.
1 36-in., 1 24-in. and 1 12-in. Stillson wrenches.
1 Set of socket wrenches (selected as required).
1 Full set of S wrenches.
2 Heavy crowbars.
50 ft. of heavy chain.
50 ft. of light chain.
100 ft. of ¾ in. manila rope.
1 Soldering outfit.

Prevention of Scale in Boilers

Q.—"What is the truth about boiler compounds?"

A.—It is pretty hard to make any true statement regarding boiler compounds, except that most of them are very simple ingredients combined with great secrecy and sold at a very high price, considering their composition. Of course, there are localities where the water contains some very active scale-forming properties, and it is sometimes difficult to find a suitable treatment for the water to neutralize this tendency. If you have trouble of this kind, pay a chemist to analyze your water and write you a prescription which you can mix up yourself and administer intelligently. Remember that you do not want to throw the scale down in chunks, as that will gather around the blow down and along the bottom of the boiler shell and cause a blister or sag in the plates or possibly an explosion. What you want is something that will form the scale-producing matter into a mud which will be precipitated to the bottom and easily blown out. So far as the composition of various boiler compounds is concerned, the so-called **secret** and **vegetable** concoctions are generally plain washing soda with an addition of coloring matter, perfume and sometimes a

little sal ammoniac, and some are mostly composed of sodium silicate with suitable additions for disguising purposes. Either of these are harmless and good compounds, but why pay a high price for the **secret,** when there is no secret? Shut your boilers down every month at the most for inspection and cleaning; remove the scale if there is any with scaling tools and look out for blisters and pitting; consult the chemist as suggested above, and you will have no need for listening to the wonderful tales about boiler compounds.

Keeping the Factory Going

Q.—"Our business, and perhaps others, has always been able to do all that we required, up to the present time, without any particular effort being made to sell our goods. Our orders came in for the most part unsolicited, but for several months things have been slowing up, and we are forced at last to acknowledge that we have competitors who are undoubtedly taking away from us business which we have always handled satisfactorily. Evidently it is not enough to put out a good article at a fair price. What is required that we are not giving?"

A.—There are many at the present time who are wondering where their business has gone and are asking the same questions that you are asking. There are many conditions which determine the course which trade will take in a time like this, but you may be sure that the general rules are the same as those which govern the shrinking water course—it keeps going as long as there is anywhere to go and it seeks the easiest and least obstructed channels. It is a wise man in a dry time who knows how to place his little dams and brooks so as to make the most of what water there is, and it is the wise man in business who pays close attention to the stream of commerce in a hard season when there is not business enough to go around, and directs what he can his way, making use of the tools which are open to all, namely: quality, efficient manufacturing, salesmanship and advertising. Advertising is perhaps the best tool which anyone has at their command, and if you doubt it look through any of the widely circulated papers and magazines and see for yourself what others are doing and consider the vast channels of trade which have been opened and kept clear by advertising. Advertising, backed up by quality and price attractions, will turn trade your way even in a dry time. If your business has always come to you unsolicited, you have yet to experience the real pleasure of getting ahead of competition. In any event you won't get any business these days if you sit down and wait for it, so you might as well get out the tools named above and go to it.

A Belting Question—Which Side?

FOLLOWING is a communication from a reader who suggested that the subject should be submitted for discussion in the columns of The Canadian Woodworker. We have already obtained a number of expressions of opinion on the question and we give these below. Although the manufacturers may be presumed to know of what they speak, they have not gone further in most cases than to state that they believe the hair side is the better, without giving any reasons. On the other hand, Mr. B. A. Lake has made out a good case for the use of the flesh side of the belt as the tractive surface. Taking all in all, we think that the subject will bear further investigation.

Editor Canadian Woodworker:—

Until lately I had always understood that leather belts were run with the flesh side to the pulley. Joints broke occasionally, and the belts were apt to slip under overload, but it always seemed to me that they were giving good service. Recently, however, I have been informed that this method is wrong, and that the hair side of the belt is the correct side to run on the pulley. It occurs to me that you may be able to get practical men to take up the discussion of this point and give their opinions (backed up by their experience), so that I, along with others, may arrive at a definite decision as to which side of the belt is the better to run on the pulley.

F. Hollamby, Toronto.

Trade Practice is to Use the Hair Side

My experience in this line is somewhat limited, but, as far as I know, the grain or hair side of the belt should be to the pulley. I cannot state a reason for this, except that it is the practice throughout the trade.—**R. J. Truax, Chatham, Ont.**

Hair Side to Pulleys is the Proper Way

We would say that the only proper way to run a leather belt is with the hair or grain side to the pulley. We advise users of belting to use this side. The point is mentioned in our catalogue under "General Maxims in Regard to Belts."—**Beardmore Belting Company, Limited, Toronto.**

The Hair Side is the Better

Replying to your query with regard to the correct side of the leather belt to run next to the pulley, we think it is generally conceded that the grain or hair side is the better side. In fact, many manufacturers stamp words to that effect on their single belts.—**J. L. Goodhue & Company, Limited, Danville, Que.**

Think Flesh Side is Stronger

Our experience has led us to believe that the grain or hair side is the better, because the flesh side is stronger than the grain side, and in running round the pulleys the bending of the belt puts a strain on the outside which might crack the grain, but never the flesh side.—**J. D. McArthur & Company, Brockville, Ont.**

Either Side is Good if Dressed Carefully

In reply to your letter asking our opinion as belt manufacturers as to whether the flesh or the grain side of a belt should be run next to the pulley, we may say that this is a debatable point. Some well-known English engineers claim that the flesh side should run next to the pulley to conform as nearly as possible with the natural growth of the hide, while other equally good authorities claim that better results can be obtained in the way of getting a closer hug of the pulley surfaces and greater transmission power by run-

ning the grain side to the pulley. It seems to us that it makes little difference which side is used if the driving face is kept pliable by the occasional use of a dressing of dubbin, which feeds the fibre and lengthens the life of the belt. The best dubbin is made from pure cod oil and tallow.—**The J. C. McLaren Belting Company, Limited, Montreal, Que.**

Favors the Hair Side

I am in favor of running leather belts with the hair side to the pulley. At any rate, I have met with the best success that way. The flesh side of leather is the stronger, and the hair side more inclined to crack; therefore, I would say run the hair side next the pulley, as it has to travel a shorter distance.—**T. B. Knight, Hamilton, Ont.**

Better Grip with Grain Side

We always recommend running with the hair or grain side to the pulleys. It gives a better grip, and as all double belts are made with the hair side out on both sides of the belt it follows that manufacturers recommend the use of the hair or grain side. We know of a number of people who are running their belts with the flesh side to the pulleys, but they are few in number, and we do not think that this is the correct method.—**Sadler & Haworth, Montreal, Que.**

Friction is Greater on the Hair Side

Your inquiry in regard to a communication from one of your readers regarding a technicality in the use of leather belting has had our serious consideration. The question which your reader has asked is a perfectly natural one, and the mistake which he has been making is not uncommon. Single belting should be put on always with the grain or hair side to the pulleys. In this way the maximum of transmission will be the result, as the coefficient of friction is greater on the grain side. Double belts, of course, are always made with the hair side out on both sides of the belt, so that it is bound to be put on correctly.—**The Graton & Knight Manufacturing Company, Worcester, Mass.**

A Machine Man Favors the Fesh Side

I am inclined to think the flesh side preferable, although there is not the difference between the two sides that some of the ardent advocates of the hair or grain side would have us believe. My first reason for leaning towards the flesh side is that I grew accustomed to it in English practice, but I think I can give a few mechanical reasons also for always running the flesh side of the belt to the pulleys. If a piece of leather be examined closely it will be noted that the hair side is comparatively hard and smooth, while the flesh side is rough and soft, and also elastic. Now a belt is called on to transmit power from one pulley to another, and in doing so it is subjected to strain—direct between the pulleys—and to a bending and gripping stress when actually in contact with the pulley. These strains are entirely distinct, and on account of the difference between the two sides of the belt it would seem reasonable to apportion the work between these two sides so that each does its share. When the hair side is run next to the pulleys the whole of the work is done by that side: it has not only to take the grip of the pulley, but it also has to transmit the strain between pulleys as the flesh side stretches a little, throwing all the strain on the hair side. If the belt were reversed the flesh side would be doing the gripping of the pulley and the other side would transmit the power between the pulleys. Thus the work can be apportioned so that the whole of the substance of the belt is made to give service; whereas with the hair side to the pulley the flesh side is practically useless except in so far as it adds a little weight to the belt. This is how the whole question appears to me, and as long as I am able to get the results I have been getting by running the flesh side of all machine belts to the pulleys I shall continue to view the matter from the same angle.—**B. A. Lake, Montreal, Que.**

An Advocate of the Smooth Side

It is of interest to give the following expression of opinion contributed to a recent issue of Barrel & Box by N. G. Near:

Always run the smooth side of the belt in contact with the pulleys.

This subject has been discussed considerably among belt men, and arguments are usually unconvincing, because there is no actual proof brought to bear on the subject. It is my aim here to show just why the smooth side is the correct one to use where a considerable load is to be pulled. Where the load is light, it makes little difference which side is used.

In the first place, all manufacturers agree that the smooth side is the best, and many of them stamp on their belts, "Run this side in contact with the pulleys." That should be a pretty strong argument, yet many belt men deliberately use the rough flesh side anyway. They say the rough side should produce more friction.

However, actual tests have proved beyond a shadow of doubt that belts wear out more quickly where the rough side is made to do the heavy pulling. In one test two belts exactly alike were run side by side on pulleys of the same size on similar machines, and each belt doing the same amount of work. One was run smooth side against the pulleys and the other the flesh side. The result was that the flesh side belt had to be replaced in three months, whereas the other was as good for all practical purposes as when new. It has not been replaced yet, after a couple of years.

In another test four belts were used. Two were operated flesh side against, and two were operated smooth side against pulleys. The results were the same as in the first mentioned test. The flesh side belts had to be replaced.

If anybody is in doubt as to the correctness of these results I would suggest that he try similar tests himself.

If you have only one belt and cannot make the test very well, run the belt one way for a while and suddenly stop the drive. Feel the pulleys with your hand. You will find that with flesh side in contact the pulleys become hotter, which is a certain indication of greater loss of power. It is this heat, usually, that destroys the belt; for most animal and vegetable substances cannot well withstand high temperatures. Leather especially is destroyed by heat very quickly.

This heat is caused by slip, of course, and slip is a bad thing. Slip should not be allowed and can invariably be prevented by proper treatment with belt dressing preparations. However, even with belt treatment the smooth side is best, as may be proved to your

own satisfaction by feeling the pulleys as already mentioned.

Belt traction does not depend upon belt roughness so much as upon belt contact. The idea is to make every square millionth of an inch of belt come in contact. The more contact, the better. Hence the desirability of as large an arc of contact as possible. The best way, then, to do this is to use the smooth side of the belt in as flexible condition as possible. Flexibility is a great aid in allowing the centre belt surface to come in intimate contact.

My last argument is this: Manufacturers of two or three-ply belts always make both sides smooth, making it impossible to run the belt flesh side next. It would be possible, of course, to make two-ply belts in such a way that both sides would be flesh sides.

The Hardwood Market

THE improvement noted at the end of March has been fairly well sustained. From the time of the outbreak of the war to the end of last year retailers' stocks were kept down to a minimum, but the improvement in trade generally this spring caused many to bring up their stocks to a level somewhat nearer the normal. In fact the demand made it absolutely necessary for the retailers to get in further lots of some classes of lumber, and naturally this had a considerable effect on the tone of the market. Last month it seemed that there was likely to be a considerable increase of business for a time, but although the improved level has been maintained, it is not increasing at present. It is just a reflection of the feeling in regard to the war. The present conditions may be well described as "spotty" in location and in time. One week shows activity in one locality, and the next finds larger sales taking place in some other district.

Furniture manufacturers have kept out of the market as long as possible, and many have very little stock on hand. From the outbreak of the war they started to adopt a policy of watchful waiting. One large furniture manufacturer recently was considering plans for closing down his plant. Before doing so, he paid a visit to the prairie provinces, where he secured so many good orders that he decided to go ahead with his manufacturing operations. With this manufacturer practically all the dry stock he owned was in the kilns. He had to go into the market immediately with a substantial order.

The yard trade is quiet, but as in the furniture line no great quantity of stock is carried, and any improvement will bring it into the market almost immediately.

The market for hardwood for building purposes is practically negligible at present. Such buildings as are now going on are generally residential, and although many are of the better class, using hardwood floors and trim, they are not sufficient in number to have any great effect upon hardwood sales in general. The upward slope in the chart line of trade conditions has taken on an easier grade for the present, but without showing signs of falling before starting on its next rise. Last month a rise was noticed almost throughout the trade, but now it is not so decided in character. The tide has turned, but all the waves are not reaching the same mark.

The Lumber Trade Journal (New Orleans), comments as follows:

"The hardwood trade is gradually growing stronger though lacking in sensational features. Demand is expanding slowly, and large sales are coming into the market more frequently. While not much improvement has so far been made in prices, they are growing firmer, with advances here and there. Ash is in good demand, and the market is aided by the exceptionally favorable situation of that wood in the export trade, while walnut is holding firm by reason of the large demand for gun stocks. An interesting feature of the effect of the war demand appears in a Chicago report that there is an exceptional demand for wagon box boards, an inquiry being out for 15 million feet of gum for boxes for army wagons. Under this demand prices have made a material advance. Aside from this, however, improved conditions in the country are making for better demand for various manufactures, especially for agricultural implements and furniture, and this influence is beginning to make itself felt in the hardwood market."

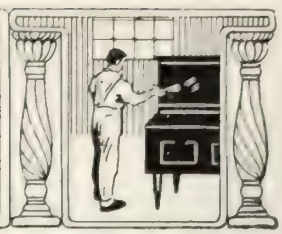
Southern Hardwood Sales in Ontario

The first issue of the periodical reports of actual sales of hardwood lumber by members of the Hardwood Manufacturers' Association of the United States has been issued by the Association. The report is compiled by the secretary and contains lists of the actual amounts, sizes and prices, of sales made in the different districts of the United States and Canada which are covered by the Association. The secretary states that future reports will be more complete as reports are now coming in from all parts of the country. It is interesting to our readers to note that the first report contains notice of sales in the Toronto territory covering all points in the province of Ontario east of Lake Huron as follows:—Chestnut 30,000 feet at prices varying from $22 for 4/4 in., sound wormy, to $52 for 5/4 in. and 8/4 in. Fas.; plain white oak, 33,000 feet at prices varying from $42 for 8/4 in. No. 1 common to $62 for 8/4 in. Fas.; 19,000 feet of plain red oak at $60 for 6/4 in. Fas., $62 for 8/4 in. Fas., and $68 for 4/4 in Fas.; 7,000 feet of quartered white oak, 4/4 ins. Fas. at $82; 16,000 feet of rough poplar, 4/4 ins. Fas. at $57; 4,000 feet of rough poplar, 5/4 in. select at $48; 3,000 feet rough poplar 6/4 in. select at $48; 8,000 feet rough poplar, 4/4 in. No. 1 common at $42, and 3,000 feet of rough poplar, 4/4 in. No. 1 common at $38.

Belgium was one of the greatest wood-working countries for its size in the world, and consumed annually a fair quantity of our cabinet woods. Let us hope, therefore, that when the troubles in Europe are over, this little country, that has suffered so much, may rapidly regain its place in the furniture and woodworking industry.

A recently patented fire escape that can be moved from window to window of a burning building consists of an extension ladder suspended from trolley wheels, which run on a suitable track permanently attached to the building just below the roof cornice. A person standing on the ladder or on the ground can move the fire escape to any point where it is needed, and in the case of flames bursting out of a windaw the ladder can be pushed aside so as to enable those on it to descend to safety.

THE FINISHING ROOM



Modern Staining Practice on Mahogany and Oak

Specially Contributed by W. J. Beattie

THE finish on mahogany furniture is veering from the deep reddish color that has been so common for years to the brown shades which, generally speaking, are to be preferred. The red tone is purely an American innovation, as the general color of old mahogany furniture has always favored the brown tones which would be the naturel color of aged mahogany.

Of course, there will be mahogany finished in the reddish tones for some time to come, particularly in the cheaper grades, as much of the goods are supplemented by the use of birch, for the pilasters, drawer stretchers, etc. Birch takes the stain well and matches the mahogany parts better than any other substitute.

Water stain is used generally, and most manufacturers use two coats, sanding the articles after each application. It is quite practicable to use a water stain that will produce the depth of color with one application, and so save a considerable amount of labor. As a rule the finishers will tell you that this cannot be done—that they have tried it; but the writer took up the matter a couple of years ago with the stain manufacturers, and they delivered a dry color of sufficient strength to do the work with one coat, and even the doubting Thomases were forced to admit that the result was equally good. The Canadian Analine & Dyes, Limited, was one of the manufacturers referred to, and if the market is available for the raw material no doubt they can furnish the powder still.

A stain dipping vat is a great help when it can be used, and it should be used whenever the goods admit of it. A vat raised from the floor a few inches is much better than one that is not elevated, as it facilitates the work in two ways: a shallow vat can be used, and the workman can stand closer to it. The advantage to a man, especially to one with rather long "understandings," is quite apparent. A good lid, having a rope, pulley and counterweights, to close down over the stain vat when not in use, is desirable. Having an iron drain pipe running from the bottom of the vat, controlled by a valve, is a good point, when it comes to cleaning out before making a fresh lot of stain, as considerable dirt accumulates in the course of a few months, and a periodical flushing out is a good thing.

Mahogany oil stain has been one of the impossible things until quite lately—that is, one that will hold its color and not fade, and in that way equal the water stain. The Marietta Paint & Color Company, I feel sure, have accomplished it at last. About a year ago the writer had a sample of their oil stain sent to him, and pieces of birch and mahogany were finished just as a piece of furniture would be. The two samples were then placed in the window, where they remained for some months in the strong sunlight, and they held their color. This will be considered a sufficiently severe test I think.

The prevailing brown tones in mahogany finish of better grades will sidetrack the use of birch or gum as a substitute in some of the portions of mahogany furniture, as it is useless to try to finish these woods in the same color; the grain is not similar enough under the more transparent finish, so that the brown colors mean a victory for mahogany unadulterated, which is well. Birch is too good a cabinet wood, alone, to need the help, even of mahogany, to sell it, and should be sold only as good honest birch.

The finishing of the still popular golden oak has been pretty well a standard so far as color is concerned for some years, the goods of one manufacturer matching the others very well. The difference, if any, is not in the finishing material; it is in the cleaning up of the surface by the sanding machines, or the lack of it. Take two pieces of oak and run them both through a triple drum sander, then leave them for a week or so, the same as would be the case in a batch of goods going from the machines to he bench; sand one piece with a belt sander of fine paper, stain and fill the two pieces with the same stain and filler, and the one will generally be three or four shades darker than the other, and unless the dark piece is well sanded after filling the difference will remain. I have often seen finishers blamed for such things when the fault lay in the improper sanding of the wood. With the introduction of belt sanders for surface sanding it is necessary to sand all the surface of each article in order to have a uniform effect from golden stain and filler, and any one who knows the first thing about these matters has seen the fuzzy appearance on the surface of oak, unless it is finished off by fine sandpaper. In factories where the scraping machine is used on the larger surfaces this difficulty is avoided, as the scraper leaves the surface bright, level and clear and the beauty of the wood is better brought out in the finishing.

The sap streaks are also in evidence in finishing golden oak, as in fumed, though it is easier to banish them. One method in vogue is to coat the sap streaks with olive oil applied with a soft camel's hair brush. This prevents the stain from penetrating too far and producing a black streak. Another way is to stain the sap streaks with the regulation stain, wiping it off that part as soon as applied and leaving the stain to dry as usual on the remainder. After the filler has dried, previous to shellacing, if any sap streaks show, make a solution of color soluble in water and apply with a soft cotton pad just moistened with the solution; this will be found a good equalizer and easy to do, as the water evaporates immediately and the shellacing is not at all delayed.

We can get substantially the same pleasing color tone effects that are secured from Circassian walnut, but there is no other wood which furnishes the great quantity, beauty and variety of striking figure combinations.

The First Aid Column

A department within a department to which Foreman Finishers and others are invited to turn for a solution of the practical problems encountered in their work. Readers are particularly requested to give the trade the benefit of their experience from time to time by replying to the questions asked. A number of new queries are to hand this month. They are given below. Be a live wire. Let us hear from you.

Filling Weather Checks

(Question asked in the April issue of The Canadian Woodworker.)

Is there any method of preparing lumber that has been checked by exposure to the weather, so that a good finish can be applied? The ordinary paste filler seems to sink in, and we should be glad to know if there is any other material we could use to fill these cracks properly.—**Bryan Top Company.**

Answer by T. King, of Burroughes & Watts, Limited, Toronto, Ont.

To fill cracks or checks in wood surfaces that are to be finished, apply plaster of paris mixed with glue and water. Allow this to harden in the cracks and sand smooth. The wood will then be ready for the ordinary filler.

* * *

Answer by G. Neville Waters, Stratford, Ont.

The best thing I know is putting in "slivers." These are easily glued in if veneer is used. For small checks the best thing is to make a paste of orange shellac and yellow ochre. This will dry quickly, fill fairly large holes, and take stain; and it can be sanded off nicely.

* * *

Answer by Conrad Schaaf, Hanover, Ont.

I am at present mixing silex with shellac for the use of cabinet makers to fill small checks. These materials are mixed with a shade of Vandyke brown ground in vinegar, and the results obtained in filling small holes have been very satisfactory. I think the Bryan Top Company might do worse than give this composition a trial.

* * *

Answer by W. J. Beattie, Owen Sound, Ont.

Presuming these checks are small, try a paste of equal parts of flour, cornstarch, brown japan and boiled oil. Rub this well into the checks and allow it to dry. Sand off well before applying the regular filler. If this does not dry fast enough increase the proportion of japan. If checks are very open, filling with wood would be better.

* * *

Answer by L. G. Schwartz, Wiarton, Ont.

In finishing checked lumber, I would advise the following method:—Put a little oil in the stain so that it can be wiped clean. Before applying the filler, give the work a coat of shellac, composed of one part of shellac to four parts of alcohol. Sand lightly with No. 00 sandpaper, and dust off well before applying the filler. This should level up all checks.

Answer by L. W. Roth, Berlin, Ont.

I think that a good composition for use in checked lumber can be made by mixing a thick paste with hot water, including three parts starch, one part glue and two parts of very fine sawdust of the same kind as the wood to be filled. The whole should be heated to about 190 degrees, and the sawdust should be added after the glue and starch have dissolved.

* * *

Answer by The Glidden Varnish Company, Limited, Toronto

We are informed that some concerns make a filler from sawdust and glue for filling large cracks in lumber. After this glue mixture has become thoroughly hard, it is sanded and finished in the regular way.

We understand that Wm. Zinzer & Company, of New York, make a special filler for this purpose and that this is one of the best articles on the market for the filling of these checks in wood. The ordinary paste filler is not suitable. It requires something like the glue and sawdust mixture or the Wood Cement Filler to adhere properly to the sides of the cracks.

* * *

Answer by Berry Bros., Walkerville, Ont.

A great deal depends on how badly the wood is checked. There are a number of so-called crack fillers in the market. These can be used to advantage in filling up cracks or fissures in woodwork when an ordinary paste filler has not sufficient body to perform this office. The mission of paste filler is to fill the grain of the wood and not to perform work that belongs to putty, or crack fillers.

Some finishers use colored shellac in stick form which is melted and run into the cracks. This meets with more or less favor by furniture manufacturers and others. Crack fillers can be procured of dealers in painters' supplies as can the colored stick shellac.

* * *

Answer by The Marietta Paint & Color Company, Marietta, Ohio

The question of lumber that has been checked by exposure to the weather is rather a difficult one, but if the checks are not too wide a coating of glue applied to the lumber before it is dressed usually gives the desired results, as the glue penetrates into the cracks and dries in there. When the surface is sanded off smooth, the glue is removed from the whole surface, excepting these checks, and they will not open again, if the glue is properly cooked. Such checks cannot be filled with a paste filler, because they are too deep. They are not like a pore in the wood. If the checks are very large they can easily be filled in with the modern crack fillers, which do perfect work in that line.

* * *

Answer by The Imperial Varnish & Color Company, Limited, Toronto

As a rule a check in the wood "keeps on checking"—which is the main reason why a paste filler seems to sink in, as the check is constantly widening and deepening. When the finish sinks in through a paste filler, it is generally due to the drier employed—unless it is caused by the further opening of the check. No matter how good a filler base is used, whether it be silex,

silver white, or any other, although the grain of check may be well filled, it is always porous, and the varnish sinks in through it. The remedy is to use a gum japan drier which corrects the porosity of the filler, and provides a film through which the varnish will not sink.

Some finishers have attempted to use varnish for this purpose, but it makes the filler almost too stiff to wipe off. There are many good gum driers on the market, worth about a dollar and a half a gallon, or perhaps a little more. What is called gold size japan is one of these. A filler made with such a drier would perhaps fill the checks satisfactorily, and would certainly improve the filling of open grained woods. It is worth trying at any rate.

* * *

Answer by Albert Hudson, Hespeler, Ont.

A rather good filler can be made by taking some fine sawdust of the same wood and steeping it in water for a week, afterwards boiling it for a little time, when it will form a cake. Mix with a little glue as required and it will be found that any checks properly filled with this composition will give a good job when finished. A very hard cement may be made by melting equal quantities of brown rosin and beeswax and adding the desired coloring when the two are perfectly melted. This cement must be used while hot, for it becomes practically as hard as stone when cold and will not shrink or sink in when used as a filler for a surface check. A sawdust cement may be made by dissolving one ounce of the very best glue in sixteen ounces of water. When the glue is dissolved and the size is cold, stir in some of the required kind of sawdust and add whiting, forming a putty. This will make a satisfactory filler if handled properly, and coloring may be added if necessary. Whiting putty for hardwood finish should be made from dry white lead. The lead gives a clearer color than whiting, where it is to be colored, besides which the lead putty will not shrink if a little varnish is added. Another method is to fill up all small checks with litharge colored to match the wood, finishing with a coat of glue size. All checks should be properly filled up and given reasonable time to harden before going to the sander, so that a perfectly flat surface is the result.

Wanted—A Stain for Fir

(Question asked in the April issue of The Canadian Woodworker.)

Can I secure a description of a good stain for fir through the medium of the First Aid Column? The work I have to finish is the interior trim of a house and also some of the inside doors. I wish to get really good results, and shall hope to receive useful information from other readers of the Canadian Woodworker.—"Mill Finisher."

Answer by The Glidden Varnish Company, Limited, Toronto

Practically any good oil stain is satisfactory for staining fir. Our Endurance wood stains are excellent for this purpose. Fir is finished generally by applying a coat of stain, a coat of Surfacene, and then a coat of varnish.

* * *

Answer by L. G. Schwartz, Wiarton, Ont.

For staining fir "Mill Finisher" might try the following:—mix the stain with oil, turpentine and japan, and after applying sand smooth with fine sandpaper, and wipe off with a soft rag before the stain gets too dry, being careful not to get too much japan in the stain.

* * *

Answer by T. King, of Burroughes & Watts, Limited, Toronto

For a mahogany stain for fir, mix one part of raw umber and three parts of burnt sienna with equal quantities of raw linseed oil and turpentine, adding a little gold size. Apply freely with a brush, and wipe off with a clean rag. For an oak stain use raw sienna and a little burnt umber.

* * *

Answer by Albert Hudson, Hespeler, Ont.

A good stain for fir can be made by using one-third oil, one-third benzine and one-third benzol, with enough driers and the proper amount of color to give the shade required. The stain will penetrate the wood so well that it will have the appearance of a water stain, while having the advantage of not requiring sandpapering. Give the stain one coat of shellac and a coat of varnish, and the result will be a good finish. Fir is susceptible to a very fine finish under transparent stains.

* * *

Answer by W. J. Beattie, Owen Sound, Ont.

You will have to use a spirit stain, as fir is a resinous wood and a water stain might not give you the results you want. Get several pieces of fir and have some stained with water stain, and others with spirit stain, and take your choice. If the fir takes the water stain well, use it and sand with fine sand paper after drying; shellac with thin shellac, varnish with two or three coats of good carriage varnish and rub dull. If you use a spirit stain, get some made by a manufacturer who produces a non-fading brand, as spirit stain will not hold color as well as a water stain. As you do not say what color you intend using, I cannot advise definitely.

* * *

Answer by the Marietta Paint & Color Company, Marietta, Ohio

The question of securing a good stain for fir is not a very difficult one. We advertise through the medium of your journal our new non-fading mahogany stain, which is practical in its use on any kind of wood. It is not like a water stain, in that it does not raise the grain, but rather leaves the surface smooth. It does not bleed out in the varnish. It can be finished with a thin coat of shellac directly over the stain, and as many coats of varnish as desired. The varnish is polished on the very highest grade of work. Our stain is used on genuine mahogany as well as on the cheaper woods, and it penetrates all kinds of woods; therefore it makes the surface uniform, which is a great point in favor of a stain of that character.

* * *

Answer by Berry Bros., Walkerville, Ont.

Either water, oil or spirit stain can be used on fir. We prefer water stain, because it makes more transparent color effects than any other. One objection to water stains is that they are apt to raise the grain of the wood, but this danger is reduced to a minimum if they are used carefully. Apply with a soft brush or sponge, and rub into the wood with a pad of cheese cloth. This absorbs the surplus moisture and does

away with any undue danger of raising the grain. Follow the staining when dry with a coat of white shellac. A thin coat is all that is necessary. Sand lightly with fine sandpaper and follow with the desired varnish. Two coats of the best interior finishing varnish over the shellac coat will make an excellent finish. See that the first coat is hard before applying the second. The last coat can be allowed to remain in the natural gloss or rubbed down to a dull, smooth finish with pulverized pumice stone and oil or water, as may be preferred. The choice of color in staining is one of individual taste.

* * *

Answer by the Imperial Varnish & Color Company, Limited, Toronto

A good brown walnut water stain can be made as follows:—one gallon of water, one pound dry Vandyke brown, one pound sal-soda, and two ounces bichromate potash; boil for about thirty minutes, stirring thoroughly. The stain gives best results if applied hot. If darker than is required, add more water; if too light add more Vandyke brown and soda. This will bring out the figure of the fir very well, but raises the grain to some extent, as all water stains do. The work should be well sanded with No. 00 sandpaper before finishing after the stain has been allowed to dry for two hours. It will take any kind of finish, but best results are obtained by using shellac for the first coat, sand-papering this down well before applying varnish.

If other colors are required, such as forest green, golden oak, weathered oak, of almost any shade, this company make a wide range of them under the name of "Artique Stains." These are of the nature of oil stains, and do not raise the grain. It is necessary to use shellac for the first coat, as varnish would lift the stain slightly, being of the same nature. After the shellac is on and dried any number of coats of varnish may be applied.

In using the water or other stain the stain should be tried out first on a separate piece of wood to see that the shade is correct before applying it to the body of the work.

Testing Varnishes

(Question asked in the April issue of The Canadian Woodworker.)

Can any readers tell us by what means it is possible to determine the durability and general usefulness of different kinds of varnishes. We have not been getting the results we have aimed at, and we should appreciate any information which would enable us to form a dependable opinion of a varnish before using it.—**Evans & Company.**

Answer by W. J. Beattie, Owen Sound, Ont.

A chemical analysis is the only test that I know of, and that is generally beyond most of us. If the varnish is bought from a reliable firm, and used as it comes from the barrel or can, with the same varnish for each coat, there should not be any trouble. The better the varnish, the slower in drying, as the better grades contain more oil and less resin than the cheaper ones.

* * *

Answer by Conrad Schaaf, Hanover, Ont.

The only way to test the quality of varnish is to analyze it or try it on sample panels of the wood to be varnished. It is best to purchase varnish from a reliable firm, who should be informed of the use for which the material is required. It is advisable not to apply the varnish coat so heavy in the spring and fall as in the summer. In any case, the finished effect depends a great deal on the way in which the varnish is applied.

* * *

Answer by Berry Bros., Walkerville, Ont.

There is no method by which to decide the value or durability of a varnish before using it. The only true test of varnish is service, and this can only be determined by giving it the necessary time to prove its worth or otherwise. The best safeguard a consumer can have is to choose his varnish maker wisely and use the varnishes recommended by the varnish manufacturer for specific uses. The honest varnish maker has more at stake than the consumer can possibly have. His word may be safely taken and his advice relied upon.

* * *

Answer by "Varnish Manufacturer"

By setting forth their requirements in detail before a reputable varnish house, material will doubtless be furnished which will give Evans & Company satisfaction. The varnish company will have to know the use for which the varnish is intended, the sort of material which is to be coated, and the character of finish which must be secured. After receipt of such varnish the only way to make sure of its being satisfactory is by a practical test made in using the material just as is generally required. If it is impracticable to spend the time required for the completion of such a test, the experience of other people in the same line can be depended upon to indicate the results which this company would secure. Of course, Evans & Company must choose people to deal with in whom they have confidence, and upon whose statements they can rely.

* * *

Answer by The Marietta Paint & Color Company, Marietta, O.

The most practical method of determining the value of a varnish is to test its elasticity after a given period of drying under favorable conditions; but first it is necessary to take into consideration the kind of work that you expect to produce with the varnish.

For interior uses in general a varnish that will set well in five or six hours and dry free from tack in twenty-four hours should be quite elastic at the end of ten days, and the best way to determine the elasticity is to use a sharp pointed piece of steel such as the sharp point of a pen knife. By running the blade over the surface, cutting lightly through the varnish, it should produce a ribbon-like thread—in other words, it should not be brittle and crack as the blade goes through the varnish. If it does crack the varnish is short of oil, and will not wear, nor will it stand water; it will turn white very quickly. This is only one of several methods of testing, but it is a good one.

Another simple test, and a quicker one, is to sand the varnish nicely after it is thoroughly dry, and then rub it lightly back and forth with the finger. If the varnish is short and contains too much rosin it will powder under the finger, and by rubbing long enough the whole coating can be rubbed off. This is a good test for a very cheap varnish. If a varnish were slow drying this test would be rather misleading, because

it would not rub for some time, and might be very brittle when dry.

* * *

Answer by The Imperial Varnish & Color Company, Limited, Toronto

Generally speaking, the only way to determine anything about varnish is to try it on a separate piece of the same material as your product, subjecting it to the same conditions as your work is expected to withstand when in actual use. The writer is of the opinion that a good deal of the "fiendishness" with which varnish is charged could be avoided by a little care in buying. Many varnish users demand impossible things of a varnish; for instance, they ask for quick drying and durability. Now it is impossible to combine very quick drying with durability, for the very elements which are put into a varnish to make it dry quickly will hasten its decay. There is a middle course, however, and a varnish with a fair amount of the drying quality and given a reasonable time to dry will give pretty good service.

All sorts and qualities of varnishes, for every purpose, are made in most varnish factories, and in buying it is well to observe a few simple rules. Explain to the varnish manufacturer—first, on what class of work you propose to use it; second, your method of finishing as follows: (a) what you put on first, stain or filler, or stain and filler combined, and any other particulars; (b) how long you can afford to let this dry; (c) number of coats of varnish; (d) time allowed between coats; (e) how long you can allow the last coat to dry before polishing or rubbing; (f) if you use liquid polish, what kind. (Some polishes soften certain classes of varnish considerably).

If you furnish your varnish maker with this information he should be able to supply you with a varnish that will give good results.

* * *

Answer by The Glidden Varnish Company, Limited, Toronto

The quality of varnish is determined by its fitness for use on the work intended. One varnish maker can take high-priced material and make a very good varnish from it, while another varnish maker will take the same material and make a poor varnish. A like condition exists in the manufacture of varnishes from cheaper material.

In the melting of gums we lose from 30 per cent. to 40 per cent. by weight in volatile that goes up the chimney during the process of manufacture. A formula under which varnish is made and the composition of this same varnish after it is made give two entirely separate and distinct quantitative analyses, and we do not believe that a varnish analysis is of definite value.

Regarding a simple method of testing varnish; in our opinion it is not possible for an inexperienced man to form an opinion as to the quality of varnish that would be of value for his work. The differences in the requirements of varnishes as applied by different manufacturers are very great. Also, the shop conditions have a great deal to do with the successful use of varnish. One manufacturer with good shop conditions will give two or three days between coats with a desirable air drying condition in his finishing room, while another manufacturer will want to get out the same work, allowing only 24 to 36 hours between coats under unfavorable factory conditions. In the case of the first manufacturer we should give him a varnish longer in oil, making a more elastic and durable varnish, and in the second case we should have to cut back on the oil in order to meet his requirements. Both these varnishes would cost the manufacturer the same money to produce, but there would be a difference in the quality.

We have varnish chemists, both analytical and physical, some of whom have been in our employ for a great many years. We try to standardize our varnishes in every way possible, but we find that shop conditions and the requirements of the manufacturer make it necessary for us to formulate our varnishes for his use.

Weather conditions have a very important bearing on varnish qualities in their respective classes. A varnish that will work satisfactorily in the winter, dry well, and stand packing and shipping, might prove very disastrous if used under similar conditions in the hot, humid summer months, when printing and sticking troubles are encountered.

We should be very glad indeed if it were possible to give you a method which could be used by the manufacturers in determining the quality of varnish, but we question very much their ability to determine qualities from any general test that can be suggested.

Fuming Oak Wood

(Question asked in the April issue of The Canadian Woodworker)

(a) What is the best method of uniforming wood for fuming purposes? In fuming wood in a fume box, we find that some oak takes lighter and some darker. Can you suggest a method which will aid us in securing a uniform fume without having to do so much shading?

(b) What treatment is recommended to secure the richest color after the wood is out of the fume box?—**Peppler Brothers, Limited, Hanover, Ont.**

Answer by G. Neville Waters, Stratford, Ont.

(a) The best method of obtaining uniformity lies in the selection of the lumber. As far as possible, all wood of one consistency should be put into one job. Soft oak will take darker than hard. Oak that is too dry will not fume. Care should be exercised in retaining 15 per cent. of humidity in oak to be fumed. In jointing up oak a soft piece should not be put next to a hard piece, or two shades of finish will result. The solid parts of a veneer job should be of a hard texture as far as possible, as the glue surface at the back of the veneer does not allow the fumes to sink in, as in the case of the solid stuff—hence a lighter result.

(b) I have generally obtained the best results from ammonia stain. A recent job upon which I assisted personally was that in connection with the new fixtures for a bank building. The treatment was water wash, sand, ammonia stain, sand, shellac wash, sand, shellac, sand, varnish (two coats), and rub. Scarcely any touching up was done, and the result was a really rich finish.

The Workmen's Compensation Act which was introduced at the last session of the B. C. legislature is practically a duplicate of the Act now in force in Ontario, provision being made for an administrative board consisting of only one commissioner. Probably it will be held up for a year or two, until it is seen if the Ontario Act develops any weaknesses.

Varnish Troubles Explained

By A. Ashmun Kelly in Veneers.

BLISTERING.—This is caused by oil or moisture under the varnish, or by heat acting on undry wood or on sap.

Blooming.—Varnish too new, or excess of driers. Also caused by adulterated oil under varnish, undercoat not dry, or dampness affecting the undried varnish coat. Frost and ammonia fumes also will cause it.

Blotching.—This is simply an aggravated form of pin-holing, and is caused by an oily or damp surface; or from turpentine mixed with the varnish; or improper thinning fluid used in reducing varnish. Very bad cases of blotching are also known as pitting and pocking.

Bubbling.—If the varnish, when being applied, is too warm, little air bubbles will form under the brush, but the trouble is not a serious one; cool the varnish to the right temperature.

Brush Marks.—This is usually caused by working the varnish too much with the brush, or by using one too small for the work. It will occur from using a too heavy varnish.

Brittleness.—If the varnish coat becomes brittle after getting hard dry, it is sure that resin entered its making, with perhaps too little oil and too much benzine.

Chilling.—Unless kept in a warm room, in the can, the varnish will become chilled in cold weather, and it is not fit to use until properly warmed. A chilled varnish will show in a sandy condition of the surface of the work, the surface being full of tiny specks that are bits of gum, and if the varnish be heated these particles of gum will fuse and disappear. Heat two bricks and set the can on these. Or set the can on the back of the stove, with the stopper out, and as soon as warm fumes come from the can the stopper may be replaced and the can set away in a warm place for two days, when it will be all right again.

Crimping.—This is caused by applying too heavy a coat of varnish, or by exposure to sudden change of temperature while the varnish is drying, or by applying the finishing coat before the under coat is dry.

Creeping or Crawling.—Identical with crimping.

Chipping.—This occurs mainly to enamel work, and is the result of lack of harmony in the different coats of varnish used. Brittle material in the under coats is also a cause. It may arise from imperfectly dried under coat, or from exposure to cold during drying. Also caused by poor ventilation, varnishing in a cold room, or in a room having a damp floor. Chipping is also known under the name of corduroy, in its worst form, and as silking, in a mild form.

Checking.—Caused by ammonia fumes, coal gas, washing with hot water, or exposure to sudden or violent changes of temperature while drying. Known also as crumbling.

Silking.—So called on account of its resemblance to silk. It may come from varnishing in a cold room, or from applying the varnish to a very cold surface, or from exposure to a cold draft of air during the drying, or by undry under coats, or by mixing turpentine with the varnish.

Sinking In.—Surface shows a dead appearance, and is due to various causes, such as unseasoned wood, under coat not dry, under coat porous, varnish used from a freshly opened can, but mostly due to a poor foundation.

(Continued on page 42.)

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Chapter 1—*Historical Notes*
Chapter 2—*Manufacture of Glue*
Chapter 3—*Testing and Grading*
Chapter 4—*Methods in the Glue Room*
Chapter 5—*Glue Room Equipment*
Chapter 6—*Selection of Glue*

WOODWORKER PUBLISHING CO., LIMITED
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Veneers and Panels

Preparing Core Stock

WITH the use of thin face veneers in present-day practice, it has become more necessary than ever before to pay attention to the surface of the core stock on which the face is to be glued. Many veneer men have come to regard the sander as an absolute necessity in preparing core stock for veneering, but we are of the opinion that this is an indirect method of obtaining a level surface. Often enough it is attributable to the absence of a good surfacer in the shop. A planer should be capable of doing a planer's work—or be replaced. Cores must be planed before sanding in any case, and it does not appear to be in line with modern efficiency to use two machines in completing an operation which should be performed on one.

In one factory we know of all core stock goes from the planer straight to the glue room, and the results on piano case work, desks and table tops, as well as on sewing machine cases and tables, in mahogany, quartered oak and walnut, are invariably good. In this factory the core stock is dressed to thickness on a 36-in. single surfacer, and the cross banding and face veneers are laid in one operation. Hydraulic presses are used with sheet metal cauls. The surfacer is in charge of a pretty good man and is never used on any other work. The knives are of the ordinary thick type bolted on to a square head. The grinding is done on an ordinary emery wheel and the knives are whetted by hand, no jointing apparatus being installed. The sander is never used on core stock, except in the case of tops wider than the surfacer. Such tops are glued up in half-widths and are finished a little full in thickness through the planer. Then the two halves are jointed and glued together. The sander is used lightly to level the centre joint.

It is altogether likely that a less careful man on the surfacer would upset the smoothness of the whole thing, for it would not take much variation in the surfacing to cause all the pressure to be concentrated at one point when the stock is in the press. In the case of veneer work, pressed as this stuff is, every sheet would be loose in places. In this event, the sander would come into use, and in all probability it is in this way that a number of veneer men have come to look upon the sander as indispensable. Do these men get the right angle on the question? It is pretty obvious that if the surfacer is not doing good work, the work must be made good somehow, but we do not believe in calling in the aid of another machine. Rather should the trouble be corrected at its point of origin—in this case, the surfacer. To begin with, if the knives are to be whetted by hand, it is necessary to have a capable man do the work, and it is important that no narrow or rough stuff, be dressed on the surfacer. Small stuff is generally fed through the middle, and will wear the knives hollow. When wide stuff is dressed it will be thicker in the middle, consequently trouble may be expected through light pressure at the edges when in the press.

All this, of course, is a way of getting results from an older layout. To have to keep one machine for one kind of work and perhaps have it idle for considerable periods may not appeal to a number of manufacturers. If the surfacer has to run on all kinds of wood, it should be provided with proper devices for grinding and jointing on the head, which should be of the six-knife, round block type. In surfacing cores, it is most important that no knife-marks should be visible, and for this reason a six-knife head is better than two knives on a square head. By grinding and jointing the knives on the machine they are bound to be straight after each sharpening, even if most of the stock has been fed through the centre. Thus wide core stock can be dressed with the assurance that the pressure will be evenly distributed when the veneer is put on and the whole clamped in the press.

Inquiry for Birch Veneer

Attention may be called to Trade Inquiry No. 434, appearing in the Weekly Trade and Commerce Report. This refers to a company manufacturing tea chests and other cases and who are experiencing difficulty in obtaining supplies of birch from Russia and other customary sources of supply. They are open to purchase large quantities from Canada if satisfactory arrangements can be made.

The birch veneer is required in thicknesses of 1/12, 1/20, 1/24 inch, 24 inches and upwards in width, and 54, 62 and 72 inches long. Quotations should be per 100,000 feet lots, face measure, prices c.i.f. London, exclusive of war risk. A sample, say, 12 by 10 ins. of any thickness convenient is desired. It is stated that the present inquiry is merely in the light of a sample order and that large and regular quantities could be taken. Those interested should communicate with the Department, requesting the name and address of the firm referred to in Trade Inquiry No. 434.

Drying and Redrying

"Dry and flat," in connection with veneer, is a term that it is difficult to harmonize in extremes. When a piece of thin veneer is made thoroughly dry it is difficult to keep it absolutely flat; it shows a decided inclination to kink and wrinkle, and quite often when veneer looks nice and flat it is not really thoroughly dry. It is possible to have veneer both thoroughly dry and perfectly flat, but it is not by any means as easy as it looks. The patent driers will turn out veneer that is flatter and smoother on the face than if dried in kilns or in the open air, but sometimes the drying is not as well done. It is either not thorough or involves some casehardening. Veneer can be made thoroughly dry in patent driers and in kilns and afterwards flattened out; but after all the safest and best thing for the veneer user is to resort to a redrier for putting the finishing touches on both the drying and the flattening.

Ventilation in the Glue Room

By L. M. Wilson

SOME few months ago the writer was asked to submit plans and specifications for the construction of a glue room for the manufacturing of veneered doors and a general line of mill work. The firm which was going to have the building erected made it very plain that every possible means known should be employed in order to secure as nearly perfect ventilation as possible, as well as providing some means for carrying off the foul odors. As this had always been one of my hobbies, I jumped at the opportunity offered me to try out a plan which I had worked out some time previous and, the building having been in use for about two months and no complaints being made, I feel secure in giving readers who are interested in this matter, the benefit of my experience.

I wish to say in the beginning that there may be numerous other plants with the equipment arranged in the same manner, and possibly better, but as my article treats more on the building than on the general arrangement of the equipment, I trust that the readers will overlook any errors made in this part of the work.

The building proper is 22 ft. wide, 48 ft. long and two storeys high and is built of concrete blocks. Between the foundation wall and the first layer of blocks is a layer of ½-in. skylight glass, the object in using which was to keep out the moisture, or as much of it as possible. The lower floor is concrete and is used for a sash and door department. In constructing the second floor, we used 2 x 10-in. joists placed on 16-in. centres and well bridged. The lower side is covered with beaded ceiling, but in laying the upper floor we first put down a floor of 13/16 x 10-in. fencing boards, dressed to an even thickness and laid diagonal. This was followed up with two layers of heavy building

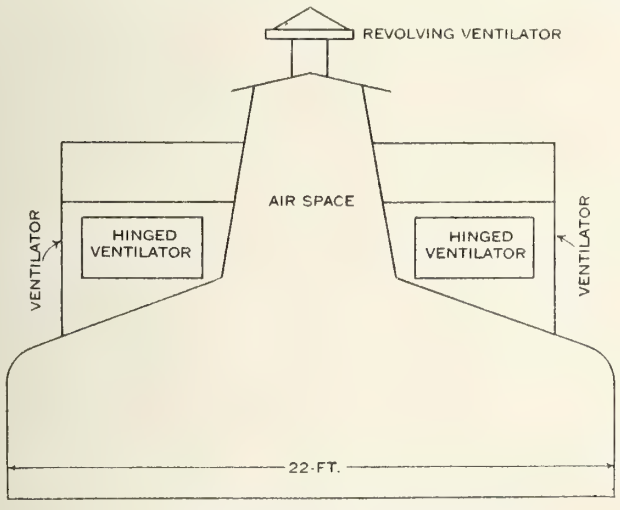

Fig. 1—Showing ventilators and round corners.

paper, one layer running lengthwise and the other crosswise of the building. This was then covered with 13/16 x 3¼-in. yellow pine flooring.

The lower floor has no partition wall, being one large department 22 x 48 ft.; but the second floor is composed of two departments, one 22 x 18 ft., which is used for a stock and cutting-out department, and one 22 x 29 ft. 6 in., where the glue room is located and which connects with the main building at the rear. The floor of this department is covered with galvanized iron, which not only protects the wood floor but is easy to keep clean.

I am well aware of the fact that some men consider it bad form to locate a glue room on the second or third floor, but I think that the general arrangement of the rest of the factory should guide us in selecting a suitable location, and the point to be most seriously considered is that of routing the work the best you can under the existing conditions, in order to keep down the cost of production. The machine room where the veneered stock was to be worked, being located on the second floor of the main building, we decided that it was best to install the glue room on the second floor also.

In order to carry out my idea of ventilation we could not have done otherwise owing to the building being two storeys high. The reason for this can be the better understood by referring to Fig. 1, which shows a cross section of the building. Any one who

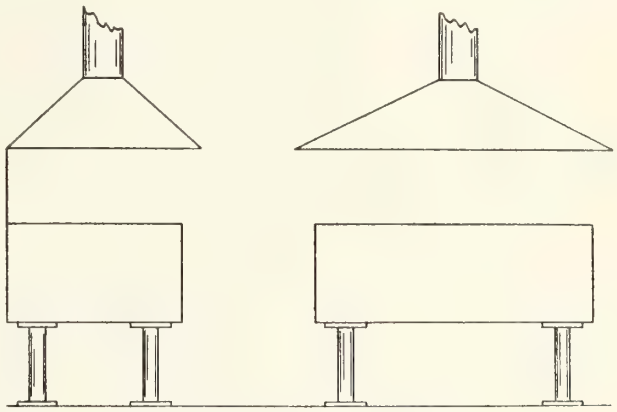

Fig. 2—Ventilating hoods over glue cookers.

has had experience in a glue room, or even visited one, has no doubt as to the foul odors that the workmen have to endure, and I remember of several instances where some employee had to leave the glue room for a short time owing to a sudden illness brought on by inhaling the fumes which are thrown off by the cooking glue. In order to overcome this evil I decided to try out (with the company's approval) on a larger scale, a device which I have placed over my gas stove, and which is shown in Fig. 2.

The 6-in. pipe connecting with the hood over the glue cooker leads up and is joined to the bottom end of one of the revolving ventilators, located in the pipe, and just above the hood is a damper such as is used in an ordinary stove pipe. The object in using this damper is to regulate the draft according to the amount of fumes to be carried off and yet withhold as much of the heat as possible from passing out into the open air. This device was first tried out on the glue cooker only but gave so much satisfaction that one has been placed over the glue spreader also.

Another feature used in constructing this glue room, and which I believe to be a new one, is in making a round corner where the roof timbers rest on the wall plate. It is well known that the heavy, foul air will hang in the corners longer and is more difficult to eradicate than the air in any other part of the room, but we have found that by using the round corner the circulation of air is just as free at this point as it is in any other part of the room.

In constructing this round corner we had the same number of brackets sawed out of common lumber that there were rafters in the glue room, one bracket being fastened to each rafter. The ceiling was then covered with tin selgave and given two coats of white paint and the side and partition walls whitewashed, the result was a well-lighted and cleanly appearing room.

There are six of the ventilators, as shown in Fig. 1, and opening into the air space, three being placed on

each side. These ventilators are 4 ft. 6 in. wide and are constructed in the most modern manner, every precaution known for keeping out the snow and rain being used. The side and end sashes are hinged at the top of the frame and are adjusted to the size of opening desired by means of a gear and chain, the chains hanging down to within about 5 ft. 6 in. of the floor.

Another feature which I believe to be a new one is the method employed in obtaining fresh air in the glue room when necessary, and yet without destroying the temperature of the room. This was accomplished by extending two 8-in. galvanized iron pipes (one on each side of the building) from the glue room out through the stock room and through the outside wall, projecting about 4-in. on the outside and 3-in. on the inside of the partition wall. The two outside ends are covered with a wire netting, while the ends

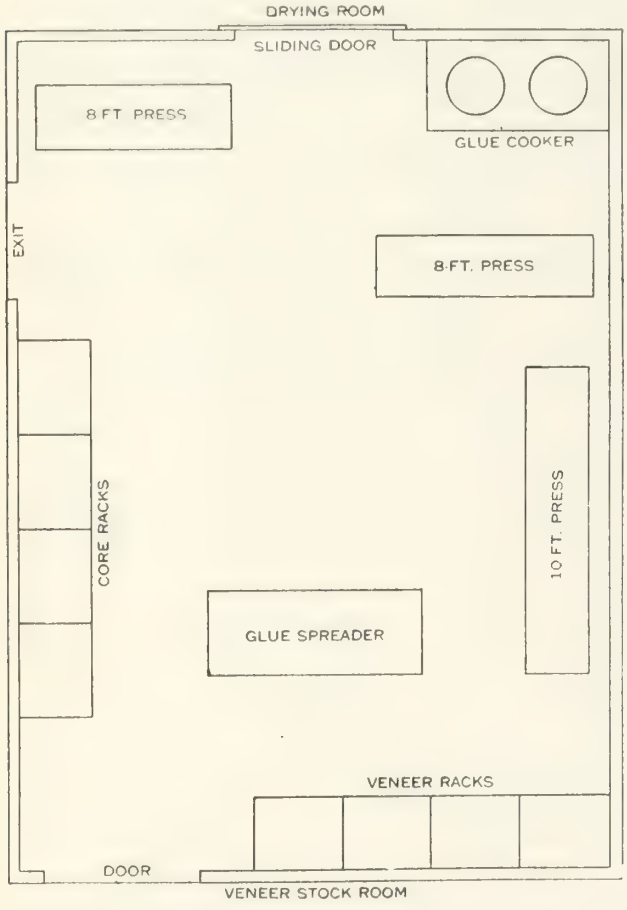

Fig. 3—The glue room floor plan.

projecting into the glue room are provided with a slide cut-off, the same as is used on a regular dust pipe.

When wishing a change of air, the workman opens these slides and the roof ventilators, and in a few moments the room is charged with warm, fresh air. This changing is usually done after the presses have been filled and while the bundling clamps are being applied. Of course, the temperature can be regulated at all times by adjusting these slides in the air ducts and opening the ventilators.

With the exception of dressing the core stock, this glue room is independent of the rest of the factory, all cutting-out being done in the veneer stock room—see Fig. 3. This department is equipped with one 15-h.p. motor, one cut-off saw, two edging saws and one 16-in. jointer.

Another reason for installing the glue room on the second floor was this: At the rear end of the machine room, where the glue room was annexed, was an old room which had been used for the storing of old, discarded machinery. Wishing to get some benefit from this space, we had this room thoroughly cleaned and whitewashed and steam heat installed, and it is now used as a drying room, where all stock is removed from the clamps. As the stock is taken from the presses it is trucked into this room and allowed to stand the required length of time, then cleaned and loaded on trucks ready for delivery to the machine room. After the stock has been machined and is ready to glue up it is loaded on trucks and taken down on the elevator to the sash and door department, and, when glued up, the work is sent to the sandpapering machines, which are located on the lower floor and within a short distance of the shipping room. Of course, one could have laid out a much better route by changing some of the machines, but the firm objected to doing this, so we had to make the best of the situation we could.—Veneers.

Formulas for Cold Glue

By F. B. Hays

THE term cold glue or liquid glue generally means an adhesive that is ready for use without first mixing with other substances or heating. There are several commercial cold glues that are the equal of good hot glues, but their selling price is so high they have only a limited use. Likewise there are several cold glues that are almost equal in cheapness to hot glue, but their holding power is so low and their life so short they are little used in woodworking plants.

When we take into consideration the fact that good cold glues are nearly all made by treating the most expensive animal glues or gelatines and then reselling the same, slightly altered by expensive processes, at an added profit of from 100 to 300 per cent. we can see why the better grades of cold glue are expensive. However, good cold glues, adapted to general woodworking use, can be made at very reasonable figures when they are meant only for immediate consumption in the shop or factory where they are made. These glues are produced by specially treating any good grade of animal glue, and when properly made will give good results if used within fifteen days after their production. They should be made in porcelain-lined, steam-jacketed kettles, and kept in closed wood or porcelain-lined receptacles. In producing cold glues very disagreeable fumes are liberated, and for this reason the glues should be made in some isolated part of the plant, or preferably in some outbuilding. The following formulas give the composition of the most satisfactory glues of this type:

1.—Soak 6 parts of good glue, broken into small pieces, in 16 parts of water, for six hours, then heat to 185 deg. F. and add 2 parts hydrochloric acid and 1½ parts zinc sulphate. Keep the mixture at a temperature of 185 deg. for ten hours.

2.—Soak good glue, 10 parts, in 100 parts water for six hours, then heat to 185 deg. F. and add 1 part nitric acid, 3 parts formalin and 1 part glycerine. Continue heating till visible chemical reaction ceases.

3.—Soak 52 parts of good glue in 74 parts of water for six hours, then heat to 185 deg. F. and add 5 parts sodium salicylate, and a few minutes later 3 parts clove oil. Continue heating till all visible chemical reaction ceases.

4.—Heat 50 parts fish glue and 50 parts water to

(Continued on page 38)

OAK MAHOGANY CIRCASSIAN MAPLE

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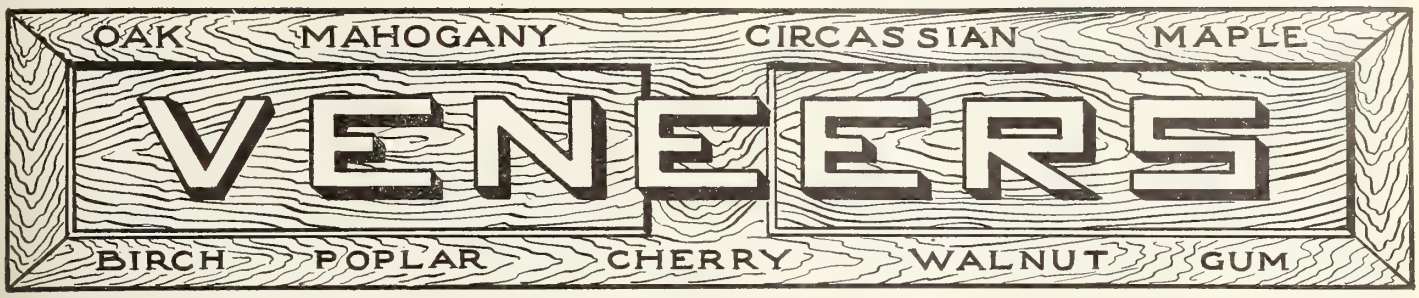

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Formulas for Cold Glue

(Continued from page 34)

190 deg. F. for two hours, then slowly add 3 parts of powdered sulphate of lead and 3 parts of nitric acid. Continue heating for two hours at same temperature.

In these formulas parts should be calculated by weight and not by volume and all water used should be either pure rainwater or distilled water. Besides the foregoing compounds there are a number of cements that are more or less used for joining wood, and which are sometimes termed cold glues. These are shellac thinned with alcohol, rosin diluted in turpentine, and mixtures of tar and asphaltum. None of these cements has very marked holding powers except on certain kinds of wood, and for general use they are not to be recommended. The most extensively used of these is sodium silicate, which is very cheap and which shows strong adhesive qualities when used on certain woods. Its life, however, is very short, being under the best conditions, about eighteen months to two years.

The advantages of cold glue over hot glue are: greater convenience; elimination of steam and gas piping; elimination of heaters and similar apparatus. The advantages of hot glue over cold glue are: less cost; greater holding power; greater reliability.

The formulas referred to above may be treated at temperatures much below 185 deg. F. if proper conditions are observed. If the very best animal glue is used and pure chemicals employed, better cold glues can be produced by heating the ingredients at 135 deg. than at 185 deg., provided the mixture is constantly stirred or agitated. Likewise, good cold glue may be made by heating ordinary commercial chemicals and medium-grade animal glue to 140 to 150 deg., provided the mixture is constantly agitated. The reason 185 deg. is given as the heating temperature is because this point seems to give the best results where agitation is omitted. The object of both agitation and heating to high temperatures is to make the desired chemical reactions more intimate and certain.

If it is desired to change the temperature specified, from 185 to 140 deg., the mixture must be constantly agitated; also it should be made in porcelain-lined, steam-jacketed mixers, positively driven, instead of porcelain-lined, steam-jacketed kettles. In regard to the formula for making cold glue from fish glue, it is best that no change be made in the temperature, as the chemical reactions do not take place satisfactorily at a lower point.—**The Woodworker.**

Trade Happenings and Opportunities

Woodworking News from Coast to Coast

The General Interior Woodwork Company, Montreal, have dissolved partnership.

The Starke Cooperage Company, Montreal, have sold out to the Paxton Cooperage Company.

The firm of Legault & Leger, operating a sash and door factory at Montreal, Que., have been dissolved.

C. B. Stein has taken over the planing mill formerly operated by Hafenbrak & Stein, of Dauphin, Man.

Additions will be made to the brush and broom factory of The Stephens-Hepner Company, Limited, Port Elgin, Ont.

The planing mill and box factory of The O. K. Lumber Company, Limited, Kelowna, B.C., is being operated on half time.

George Rivers, of Arkona, Ont., is reported to have the plans for a basket factory, estimated to cost $6,000, at Strathroy, Ont.

At Mount Forest, Ont., G. Freeman is altering his woodworking factory. He does not intend installing any new machinery this year.

Messrs. W. L. Fish & Son expect to begin operations in their butter box factory at Johnville, Que., this month. They will employ twelve men.

Mr. R. Wilson has been appointed Secretary of R. Macfarlane & Company, Limited, lumber merchants and sash and door manufacturers, at Montreal, Que.

The Montreal Manufacturing Company has been registered by James O'Sullivan, of Montreal. The company will manufacture brushes, brooms, and other lines.

It is gratifying to learn that Amherst Pianos, Limited, of Amherst, N.S., have resumed the payment of quarterly dividends on the capital stock of the company.

A contract has been entered into between The Cameron Lumber Company, Victoria, B.C., and Robert Jones & Company, timber importers, of Liverpool, England, for the shipping of five to seven hundred tons of box boards a month.

A. Legault, P. Leger and F. Bourgon, all of Montreal, Que., have registered the firm of Legault, Leger & Bourgon, and will carry on business in that city as sash and door manufacturers.

Their branch sash and door factory at Saskatoon has been sold by the Rat Portage Lumber Company, of Winnipeg, to Cushing Brothers, who will operate it in connection with their factory.

Grace & Swift will operate a woodworking plant at Kennedy, B.C., for turning out large supplies of bee-hives for the local trade. The plant is well equipped for handling almost anything in woodwork.

With a capital of $40,000, Standard Planing Mills, Limited, have been incorporated at North Bay, Ont. The provisional directors are C. W. Wilkinson, L. L. Mulholland and H. G. McDermid, all of Toronto, Ont.

C. Diebel, E. Diebel, E. E. Diebel, D. E. Weir and W. Ruttle, all of Hanover, Ont., have incorporated The Diebel Furniture Company, Limited, with a capital stock of $50,000. The chief place of business will be Stratford, Ont.

The box factory of the Kelowna Lumber Company, Limited, Kelowna, B.C., has been placed in operation on a half-time schedule, and it is probable that the balance of the plant will be started up about the middle of this month.

The Davies Furniture Company, Limited, have been incorporated at Victoria, B.C., with a capital stock of $10,000 to carry on business as upholsterers, cabinet makers, joiners and manufacturers of household, hotel and office furniture.

Tenders close on May 20th for the sale of The Moncton Woodworking Company's plant at Sunny Brae, N.B. The plant consists of a large two-storey factory about 130 ft. long—fully equipped with up-to-date machinery—two large warehouses, double dry kiln, and an office building contain-

ing four rooms. The factory is equipped with all necessary machinery for the production of fine work and building material, and other woodworking lines.

Canada Woodenware, Limited, has been incorporated at Toronto by A. Ball, E. J. Ball, M. Haviland, A. F. Haviland, and F. W. Chapman. The company will manufacture clothes pins, skewers, and other such articles. The capital stock is $40,000.

At Montreal, Que., the firm of Daly & Morin, Limited, has been incorporated to manufacture curtain poles and window shades. The incorporators are W. J. Daly, A. Morin, T. J. Shallow, J. H. Gerin-Lajoie and J. E. Cote. The capital stock is $500,000.

The S. C. Smith Sash & Door Company, Limited, Kelowna, B.C., are working on a reduced staff just now, but they look forward to a large amount of business very soon. This plant, of which Mr. C. C. Smith is Managing Director, is one of the most up-to-date in the interior.

At Ayer's Cliff, Que., Mr. Chas. Robinson has just completed a building for a sash and door factory, and expects to install new machinery shortly. This will be the second manufacturing industry in Ayer's Cliff, and Mr. Robinson has geen granted exemption from taxes for a period of ten years.

Lande's, Limited, has been incorporated at Montreal for the purpose of manufacturing and distributing all kinds of household and office furniture. The company was incorporated by M. J. Morrison, B. Rose, M. E. Cooms, L. Tannenbaum, and M. Levitt, all of Montreal. The capital stock is $49,000.

The supply shed of the barrel factory of The Acadia Sugar and Refinery Company has been damaged by fire to the estimated extent of $6,500. The Manager places the value of the stave wood burnt in the shed at about $5,000, and the damage to the plant at $1,500. The loss was fully covered by insurance.

The Rathbun Match Company, Limited, have been incorporated to carry on business as manufacturers of matches and general woodenware at Deseronto, Ont. The capital stock of the company is $125,000. The incorporators are R. P. Locke, G. Cooper, W. K. Fraser, L. M. Heal and G. S. Emery, all of Toronto, Ont.

For the purpose of manufacturing and dealing in office and library furniture and fixtures, and all kinds of fixtures for banks, churches, halls and office buildings, a new firm known as Office Bureau, Limited, has been incorporated at Aurora, Ont., by W. J. Gillespie, C. J. Gillespie, H. Melville and F. K. Fish, Jr. The capital stock of the company is $250,000.

The Ker and Goodwin Machine Company, Limited, Brantford, Ont., are a new company capitalized at $50,000, reorganized to carry on the business of manufacturing all kinds of articles made from metal or wood, including machinery and machine supplies and tools. The incorporators include W. S. Brewster, George D. Heyd and A. L. Hanna, all of Brantford.

The Columbia Handle and Lumber Company, Limited, have been incorporated to take over the business carried on by the Columbia Handle and Lumber Company, of London, Ont. The capital stock of the reorganized concern is $100,000, and the headquarters will remain at London. The incorporators include F. G. Rumball, John Stevely and W. H. Braddon, all of London.

The proposed absorption of The Lindsay Library & Office Fittings Company by The Capital Supply Company, of Ottawa, Ont., has been agreed to, and in future the sales end of the business will be handled at Ottawa, while the Lindsay concern will manufacture fittings and furnishings, for which there is a steadily increasing demand. It is expected that the Lindsay plant will be in operation this month.

The Woodworkers' Accident Prevention Association has been incorporated with an Ontario charter, the head office being at Toronto. The Provisional Directors are W. B. Tindall, W. C. Laidlaw, W. C. Irvin, Dwight J. Turner and H. S. Cane. The object of the Association is to promote efforts looking to the prevention of accidents in the woodworking industry and in any other industry which may be assessable by the Workmen's Compensation Board of Ontario in the same insurance group as woodworking.

A fire occurred recently in the plant of John Piggott & Sons, Windsor, Ont. Work has been started on the rebuilding of the damaged portion of the plant. Fortunately the engine and boiler and heavy machinery were not damaged to any great extent, and the firm expect to commence operations immediately in the undamaged portions of the mill. None of the stock in the sheds or yards was damaged, and the mill store room also was saved. The amount of the loss is not definitely known at present, but the firm believe that the heaviest item will be the indirect loss through the partial shutting down of the plant. The firm of John Piggott & Sons was established at Chatham, Ont., in 1869, and a branch was opened at Windsor in 1894. With the help of the Chatham plant, the firm are taking care of all their orders.

New B. C. Concern Will Make Boxes in Large Quantities for Export

The Laminated Materials Company, Limited, composed of Boston capitalists, with $250,000 capital, have leased the Dominion Match Company's building at Sapperton (New Westminster), B.C., and will soon be turning out large quantities of a new style of box for the U. S. and foreign markets. The location of the factory in British Columbia is due to the fact that a plentiful supply of the kinds of wood to be used in the construction of the boxes, including cottonwood, spruce, hemlock, fir and alder is to be obtained in the province at prices below those prevailing for the same class of material in the United States. That the plant will begin operations under favorable auspices is shown by the fact that orders for a large number of tea boxes have already been secured from Ceylon and India. The boxes will be manufactured by a process by which thin pieces of wood in cross sections are fastened together with a composition used under high pressure, which, it is claimed, renders the wood impervious to water, makes it non-shrinkable, and in crossing of the grain gives the material great strength and resistance in proportion to its weight. A special feature of the boxes is a triangular section covering the edges and corners, protecting and greatly strengthening and rendering them especially desirable as containers for eggs, fruit, etc. The boxes are much lighter in proportion to the size than those made of ordinary lumber. The process of preparing the material and the composition with which the sections of wood are bound are patented.

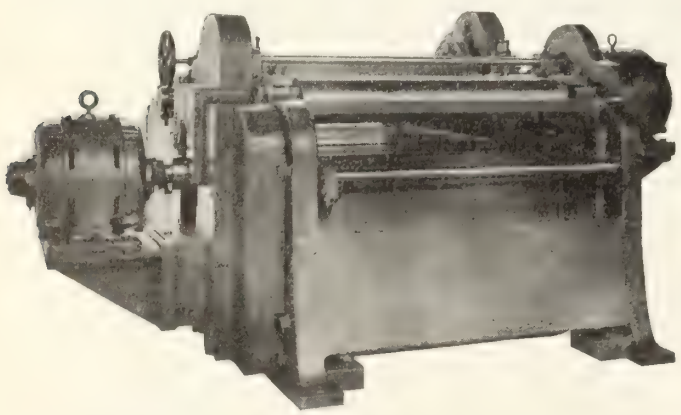
The Late John S. Anthes

We regret to report the death of Mr. John S. Anthes, of the Anthes Furniture Company, Berlin, Ont. The late Mr. Anthes was born in Wilmot Township, Ont., in 1844. He went to Berlin in 1865, and was employed for a number of years by the late Louis Breithaupt, founder of the leather and tanning business now carried on by The Breithaupt Leather Company, Limited. Entering the furniture business on his own account, he was associated with some of the pioneer furniture manufacturers of the city, among these be-

ing the late John Aldous and William Simpson. In 1884 he purchased the Berlin Novelty Works, and carried on business in his own name for a number of years. In 1901 he went into the amalgamation of furniture factories, under the style of Canada Furniture Manuacturers, Limited, in which concern he was a director for some time. He resigned the office, however, in 1906, and built a large modern factory for the production of high-class furniture, establishing, with Mr. J. C. Breithaupt, the Anthes Furniture Company. The late Mr. Anthes always took a keen interest in municipal affairs. He was held in high esteem for his public-spiritedness and progressiveness.

Direct Motor-Driven Double Surfacer

The machine shown in the accompanying cut is a 50-in. double surfacer, built especially for surfacing wide table tops, by Baxter D. Whitney & Son, Winchendon, Mass. It is equipped with thin-knife round cylinders, direct connected to high-speed motors by special flexible couplings, which can be quickly separated, allowing the cutterheads to be removed from the boxes without disturbing the motors. The top cutterhead is driven by an alternating-current motor, mounted on an adjustable bracket, bolted to frame of machine. The bottom cutterhead is driven by a motor carried on a bracket attached to the upper wedges, which raise and lower with planer bed. The brackets holding the motors have both horizontal and vertical adjustments, so that they can be quickly brought into line with the cutterheads.



A machine which is probably the largest double surfacer ever constructed.

As the motors are coupled directly to the cutterheads, the power is delivered just where it is required; no power is wasted in driving countershafts or in slipping belts. Actual tests show that this method of drive effects a saving of 25 per cent. in power alone. The machine can be set up and started in any desired place without considering the locations of line-shaft or countershaft. The advantages of a direct-connected, motor-driven surfacer will be appreciated by users of planing machines generally, and especially by those who have had trouble with cylinder belts, loose pulleys and countershaft boxes. This machine is probably the largest double surfacer that has been constructed; including the motors, it weighs 25,000 lbs.

The U. S. Blow Pipe & Dust Collecting Company is the new name for the U. S. Steel Tank & Pipe Company, exhaust system contractors, of 2090 Canalport Avenue, Chicago, and 3000 N. Ninth Street, St. Louis, Mo. The firm's new style is more suggestive of their ever-growing business in shaving and fine dust collecting for woodworking industries, grain elevators, and all plants where dust and refuse are created.

Combination Woodworker a Valuable Machine

The Hutchinson Woodworker Company, Limited, Toronto, Ont., have published an interesting catalogue describing their portable combination woodworker. This little book, aside from its advertising value, makes very interesting reading. It describes the many different uses of this interesting machine, and shows some excellent illustrations of the machine in action with some of its various attachments.

The manufacturers claim several distinctive features for it. It can be used for general work because of the fact that it can be moved readily from place to place, because it has the power to do any of the work on a building, and because it operates on the electric power from an ordinary lighting circuit. Its simplicity is another feature, and its manufacturers say that with ordinary care it will give remarkable service. The ease of changing from one tool to another is yet another commendable feature, one minute being sufficient for this operation. When the saw is being used, it will cut at any angle. Your work is directly in front of you, and the table is clear of all obstructions. The saw can be raised or lowered eight inches, and this action has no effect whatever on the belt.

The Hutchinson Woodworker Company, Limited, 99 Sherbourne Street, Toronto, Ont., will be glad to send this catalogue to any readers on request.

Trade Inquiries

THE Weekly Report of the Department of Trade and Commerce contains the following inquiries relating to Canadian trade. The names and addresses of the firms making these inquiries can be obtained by those specially interested in the respective commodities upon application to the Inquiries Branch, Department of Trade and Commerce, Ottawa.

444. **Plywood.**—A Glasgow firm desires to purchase 3-ply wood in thicknesses 4 to 9 m/m, various sizes.

445. **Veneer wood and log timber, birch.**—A Glasgow house would be glad to get information respecting supplies of the above.

446. **Plywood, birch.**—A Glasgow firm inquires if Canada can supply 3 equal ply birch 4½/4¾ m/m thick, cemented together with waterproof cement (not glue). Principal sizes required are about 24-inch x 18½-inch and 18½-inch x 18½-inch.

447. **Veneer wood.**—A Glasgow firm would be glad to have quotations from Canadian shippers on 3-ply and thicker plywood, various sizes. Quote price delivered Glasgow.

448. **Veneer Wood.**—A Glasgow firm of merchants would be pleased to have samples and quotations of Canadian veneer wood, to see if the product of Canada can be used in their business.

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The saw can be set to cut at any angle and can be raised or lowered 8 inches. This operation makes no difference to the belt as is the case with other makes of machines. There is no overhanging slide. The table is clear of all obstructions; all work is in full view, and is operated with 1½ h.p. Motor.
Patented in U. S. A., January 16, 1912. Also in England, Australia and France. Other patents pending.

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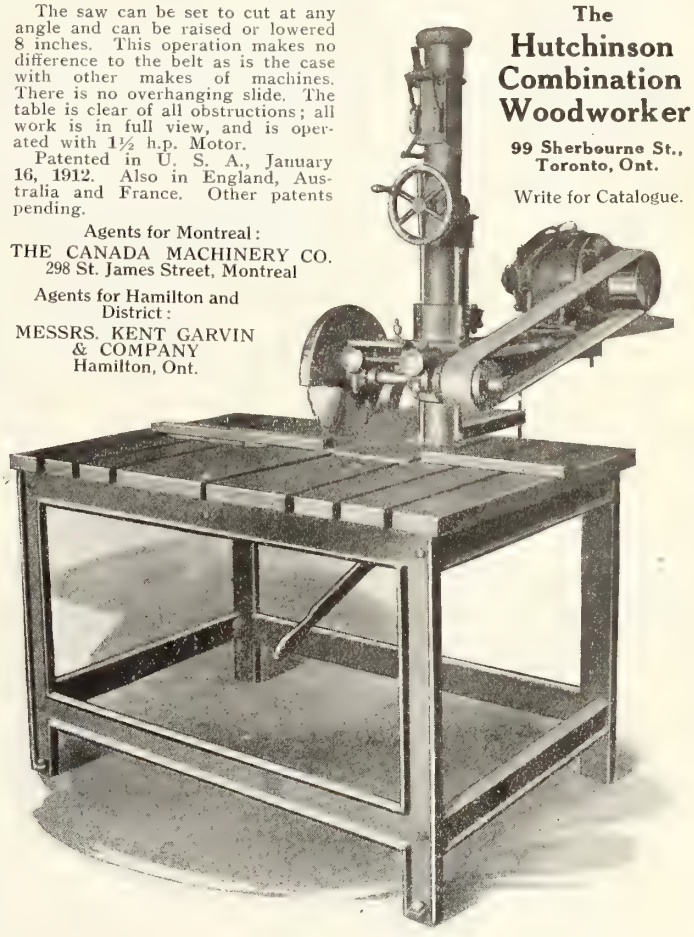

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Varnish Troubles Explained

(Continued from page 31.)

Sweating.—If a gloss appears after rubbing the varnish it is called sweating. Rubbing before the coat is properly dry will cause it, and the remedy consists in letting the coating become hard, then rub again and follow, as soon as done rubbing, with the succeeding coat. Varnish that contains much oil is most likely to sweat in the rubbing.

Seedy.—See chilling.

Sandy.—The varnished surface appears as if sprinkled with fine sand, the cause being unripe or insufficiently aged varnish, or varnish chilled by extreme cold, dirty varnish, caused by skinning over of varnish and filling varnish with particles of gum, also caused by particles of pumicestone, dirt, specks in air, lousy varnish brush, chemical change in varnish, due to extreme age, or precipitation of the gum in the varnish by extreme cold.

Sagging.—The varnish has been applied too freely, or in too heavy a coat, which causes the varnish to flow or sag down, forming "curtains" or "festoons."

Sissing.—Also known as cissing, being identical with crawling. Cissing is the British term used.

Tears.—Small, but heavy, runs, mostly about moldings, etc. Uneven application of the varnish is the cause.

Turning White.—Due to action of heat or moisture, or both together, on varnish containing resin, though alcohol will turn good varnish white.

Wrinkling.—Also crinking. A shrivelling up of the varnish coat, due to unripe varnish, but oftener to unskilful handling of the varnish brush.

Loss of Brilliancy.—This is not always due to an imperfectly cooked varnish, for if varnish be applied over a poor foundation it is sure to sink in for want of something to hold it out A varnish containing some China wood oil will bear out over a poor foundation better than a varnish that contains no wood oil.

Skinning Over of Varnish.—If a can of varnish is left uncovered long enough a skin will form over the exposed part, and this, if mixed into the varnish, or not carefully removed, will cause specks of gum to distribute through the mass, and this in turn will cause seediness. Prevention will be better than cure. Strain the varnish through muslin.

Uncorking Varnish Before Using.—Some experts say that a can of varnish should be left open to the air for two or three days, to allow gases to escape, these gases seriously affecting the varnish finish, they claim. No doubt, there is some truth, at least, in this proposition, but it would seem that a few hours, rather than several days, would be sufficient time allowance.

Temperature of Work and Stock Room.—The temperature of the filling, rubbing, varnishing and stock room must be according to the varnish and the wood. One varnish room is heated up to 90-deg., and this affects the wood, but with a lower temperature the varnish does not flow out well. A rapid drying varnish will call for a high temperature, while a slow drier will do best in a room with a lower temperature. Wood that is not perfectly dry will be affected by a high temperature, which will cause shrinking. For such work a lower temperature is best. Perfectly dry wood will not be affected by high heat. The filling of the wood and the rubbing out do best in a rather high temperature, but at the same time not too high.

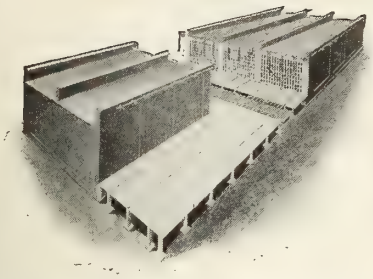
Machinery For Sale

1 14 in. Berlin Matcher
1 8 in. Woods Sticker
1 Buzz Planer
1 Tenoning Machine
1 Arm Sander
1 Sash and Door Clamp
1 Saw Table Machine
1 Turning Table
1 Steam Glue Pot
9 Small Trucks

Write us.

George Gordon & Company
Limited
Cache Bay, Ont.

MORTON HUMIDITY SYSTEM POCKET KILNS



This is the ideal type of kiln for any firm that has numerous kinds and thicknesses of lumber to dry.

Perfect Control
and
Rapid Results
build a kiln that fits your special requirements.

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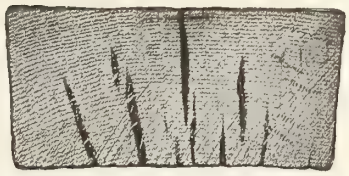
Every kind and form of

DRYING LUMBER

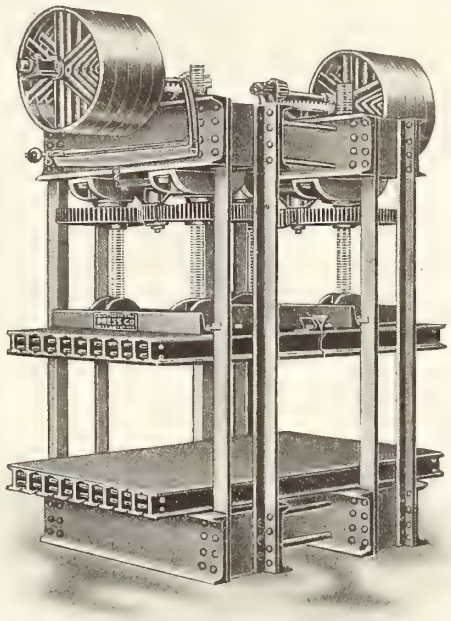
Grand Rapids Dry Kiln

QUALITY DRYING

Grand Rapids
Mich. - U. S. A.



VENEER PRESSES



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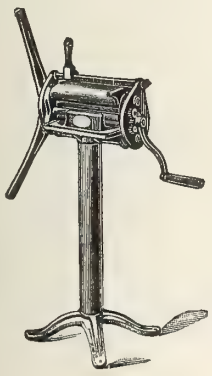
Canadian Boomer & Boschert Press
Company, Limited
18 Tansley Street, MONTREAL

"JACKSON"
Belt Lacer
For
Strong Lacing
and
A Perfect Hinge



There are cheaper machines than the "Jackson" but the supplies they require make them costly. With every "Jackson" we supply 6,000 inches of coil lacing. This is sufficient to lace 600 five-inch belts.

Get a "Jackson" on thirty days' trial.

The "Jackson Book" will interest you.

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Testing Lumber

Guessing and gambling have no place in business. When you get right down to the fine points of woodworking it is the "**know how** that counts."

You cannot buy your lumber uniform in dryness, and you must kiln dry it before manufacturing.

There is a **right** way to kiln-dry lumber, and a **right** method to test lumber to secure uniform dryness and a **right** time to remove lumber from the kiln, as it is equally disastrous to over-dry as under-dry lumber.

A **Grand Rapids Vapor Kiln** dries lumber RIGHT.

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Headings

Oak, Elm, Birch, Basswood and Maple Stock for different purposes.

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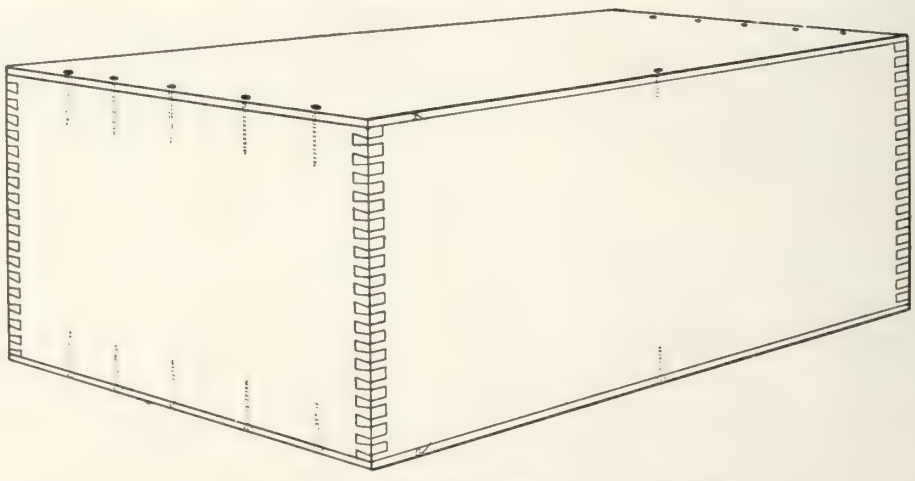

Shrapnel Boxes can be made better and cheaper on a set of Wedge Dovetail Box Machines

To frame up the handsomest and strongest box at the least cost a set is required consisting of
WEDGE DOVETAILER—Cuts Wedge Dovetail with circular saws.
WEDGE DOVETAIL SQUEEZER—The most powerful sqeezer made, will squeeze so tight a fit of pins and grooves that glue and the heavy cost of applying glue is unnecessary.
WEDGE DOVETAIL TRIMMER—With circular saws, two corners of the box are trimmed neat and clean at each operation.

We guarantee 400 SHRAPNEL BOXES PER HOUR with a crew of five. This does not include putting on tops and bottoms.

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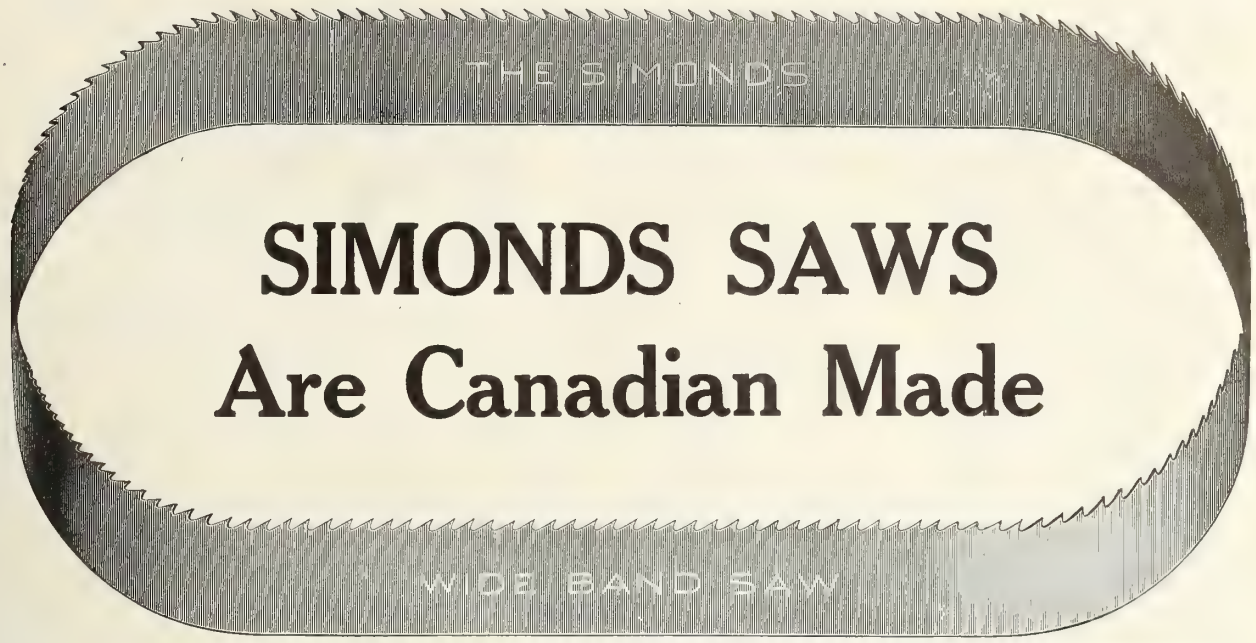

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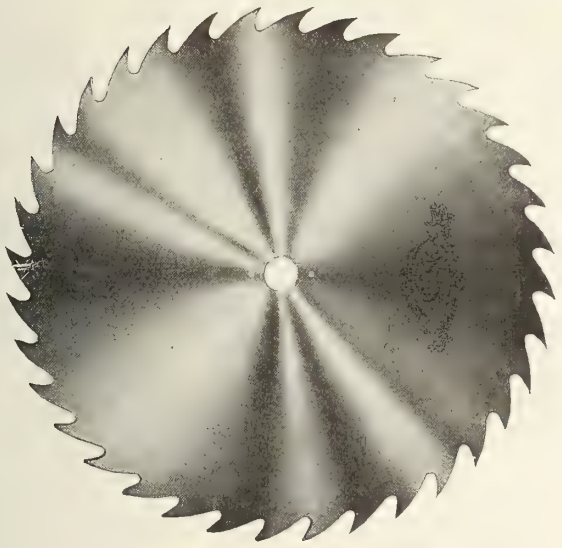
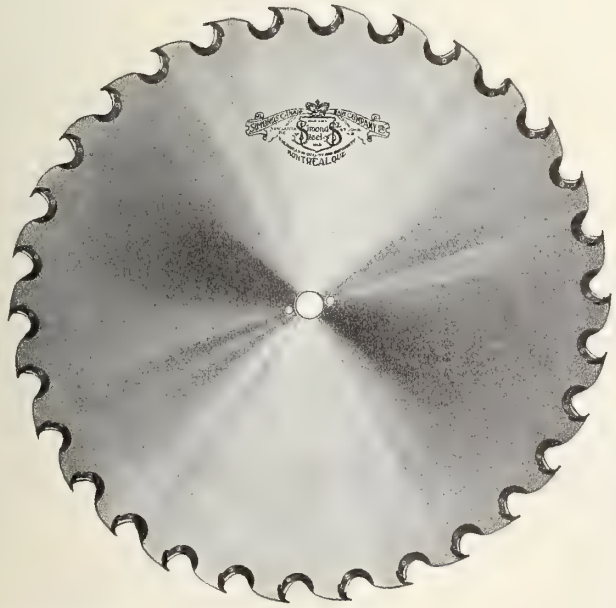
Are Canadian Made





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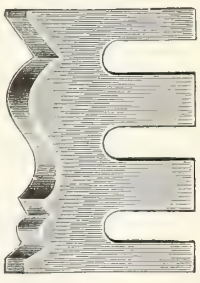
Just added to our Montreal plant a very large three-storey substantial brick building, almost doubling the plant's capacity.

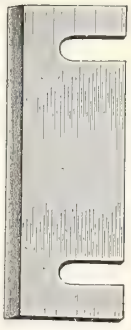
That's what we do for Canada.

These facts, together with our well-known reputation for furnishing highest quality goods entitle us to be called upon by you to supply your saws or woodworking machine knives of any size or description.

Our aim is to combine Canadian workmanship, high quality, honest prices and quick service.

Let us hear from you.





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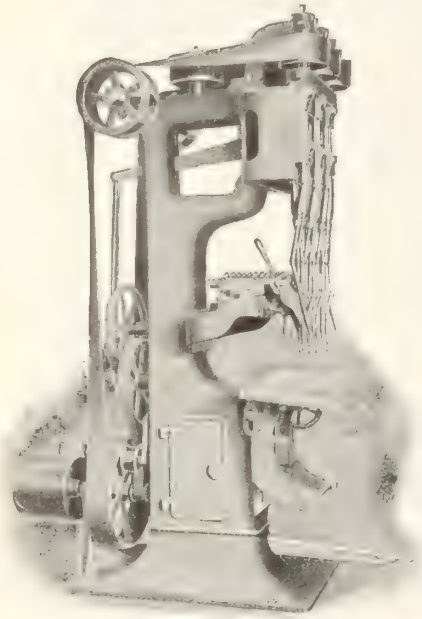
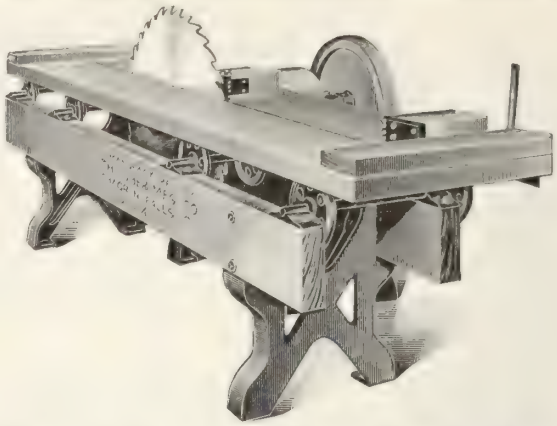


can be done by the use of my Multiple Spindle Boring Machines.

Twelve holes or less are bored at once, in a straight line, parallel lines, staggered, zig-zag, in a circle or almost any position, one inch center to center or 24 ins. apart, any angle up to 35 degrees.

Ask for details.

J. M. NASH, Milwaukee, Wis.



The Hand Feed Bolter

is the most **practical machine** for working short **Hickory** logs into **handle blanks.** The machine shown here is one of the **best.**

Write for free catalogue No. 31 of

Bolting Saws, Rip Saws, Chucks, Turning Lathes, Sanders, etc.

It will pay you to investigate **the handle business.**

Information freely given on application.

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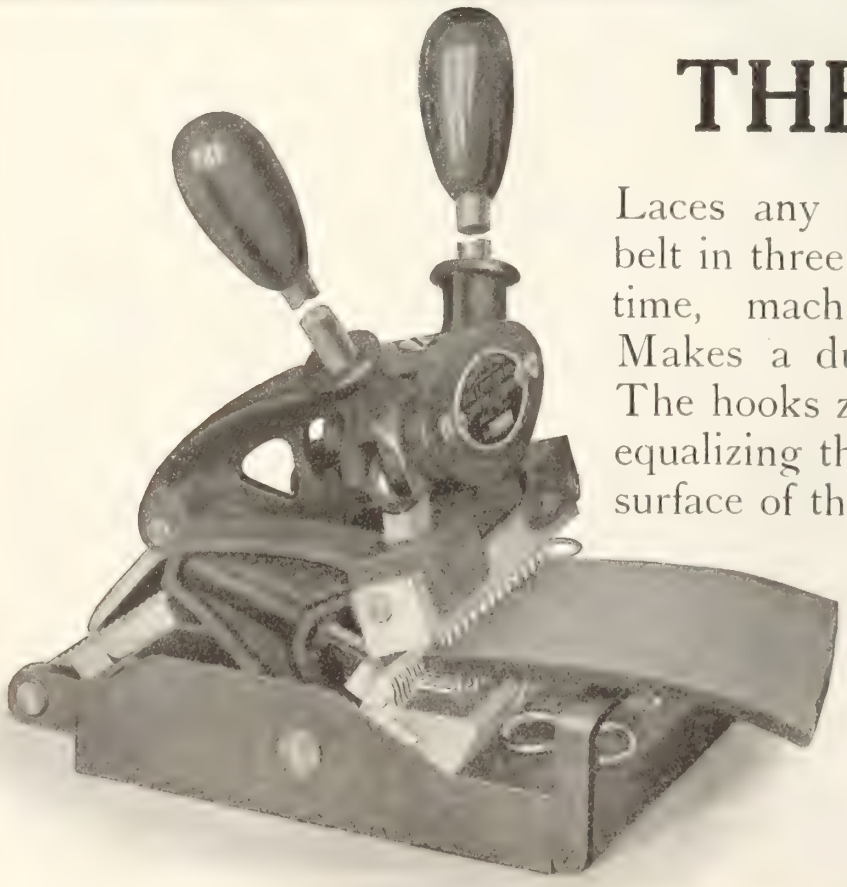
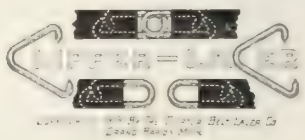


THE



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6 cars 4/4 S. W. Chestnut.
1 car 5/5 S. W. Chestnut.
4 cars 6/4 S. W. Chestnut.
1 car 8/4 S. W. Chestnut.
3 cars 4/4 No. 3 Common Chestnut.
1 car 4/4 No. 1 Common and Better Chestnut.
½ car 8/4 No. 1 Common and Better Chestnut.
1 car 4/4 Saps and Select Poplar.
2 cars 4/4 No. 2 Common and Better Poplar.
1 car 5/4 No. 2 Common Poplar.
1 car 6/4 No. 2 Common Poplar.
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Mill at Holly Junction, W. Va.

Write at once for Quotations **The Price is Right**

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Columbus, :-: Ohio

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Plain and Quartered Red and White Oak, Poplar

Prompt Shipments and High Grades our Hobby. **Mahogany** Let us quote you on your requirements.

The "Canadian Woodworker" Buyers' Directory

For Alphabetical Index see page 4

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Canadian Linderman Machine Company, Woodstock, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

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Chapman Double Ball Bearing Co., Toronto.

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Whitney & Son, Baxter D., Winchendon, Mass.

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Pryibil Machine Company, P., New York.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
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Pryibil Machine Co., P., New York City.

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Petrie, H. W., Toronto.
Williams Machinery Co., A. R., Toronto, Ont.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Clipper Belt Lacer Co., Grand Rapids, Mich.
Fuller, C. B., Montreal, Que.

BENCHES
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Sheldons, Limited, Galt, Ont.

BLOW PIPING
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

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Carborundum Co., Niagara Falls, N.Y.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

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Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
Palmer & Sons, A. E., Owosso, Mich.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Curtis Machine Corporation, Jamestown, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Hutchison Woodworker Co., Toronto, Ont.

COOPERAGE STOCK
Sutherland-Innes Co., Chatham, Ont.

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Berlin Machine Works, Ltd., Hamilton, Ont.
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Huther Bros. Saw Mfg. Co., Rochester, N.Y.
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Pryibil Machine Co., New York.
Simonds Canada Saw Co., Montreal, Que.

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Berlin Machine Works, Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

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Elliott, W. A., Toronto.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.

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Grand Rapids Veneer Works, Grand Rapids, Mich.
Morton Dry Kiln Co., Chicago, Ill.
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

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Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
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Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Sheldons Limited, Galt, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

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Berlin Machine Works, Ltd., Hamilton, Ont.
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Marietta Paint & Color Co., Marietta, Ohio.
Schmidt Co., Walter K., Grand Rapids, Mich.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

FLUTING AND TWIST MACHINE
Pryibil Machine Company, P., New York.

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The Carborundum Co., Niagara Falls, N.Y.
Delany & Pettit, Limited, Toronto, Ont.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto, Ont.

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Canada Glue Co., Brantford, Ont.
Delany & Pettit, Limited, Toronto, Ont.
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
Palmer & Sons, E., Owosso, Mich.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.

GLUE JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio.

GLUE ROOM EQUIPMENT
Boomer & Boschert Company, Montreal, Que.
Perrin & Company, W. R., Toronto, Ont.

GLUING CAMP CARRIERS
Billstrom, Nels. J., Rockford, Ill.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

GUARDS (Saw)
Pryibil Machine Company, P., New York.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HARDWARE SPECIALTIES
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Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitby & Son, Baxter D., Winchendon, Mass.

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Archer Lumber Co., Helena, Ark.
Atlantic Lumber Company, Toronto.
Duhlmeier Bros., Cincinnati, Ohio.
Imperial Lumber Company, Columbus, Ohio.
Kosse, Shoe & Schleyer, Cincinnati, Ohio.
Kraetzer-Cured Lumber Co., Moorehead, Miss.
Luehrmann Hardwood Lumber Co., St. Louis, Mo.
Mowbray & Robinson, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Powell Myers Lumber Co., South Bend, Ind.
Prendergast Company, Cincinnati, Ohio.
Shiels & Company, Chas. F., Cincinnati, Ohio.
Spencer, C. A., Montreal, Que.
Wilcox & Knapp, Conneautville, Pa.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
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Perrin & Company, Wm. R., Toronto, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Knechtel Bros., Limited, Southampton, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.

KNIVES (Planer and others)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Galt Knife Company, Galt, Ont.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

MACHINE KNIVES
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MITRE MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

MITRE SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Co., Montreal, P.Q.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MOULDINGS
Knechtel Bros., Limited, Southampton, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.

PAINTS & VARNISHES
Marietta Paint & Color Co., Marietta, Ohio.

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Lightfoot, Stanley, Toronto, Ont.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shimer & Sons, Samuel J., Galt, Ont.
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Williams Machinery Co., A. R., Toronto, Ont.

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SAW JOINTERS
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Whitney & Sons, Baxter D., Winchendon, Mass.

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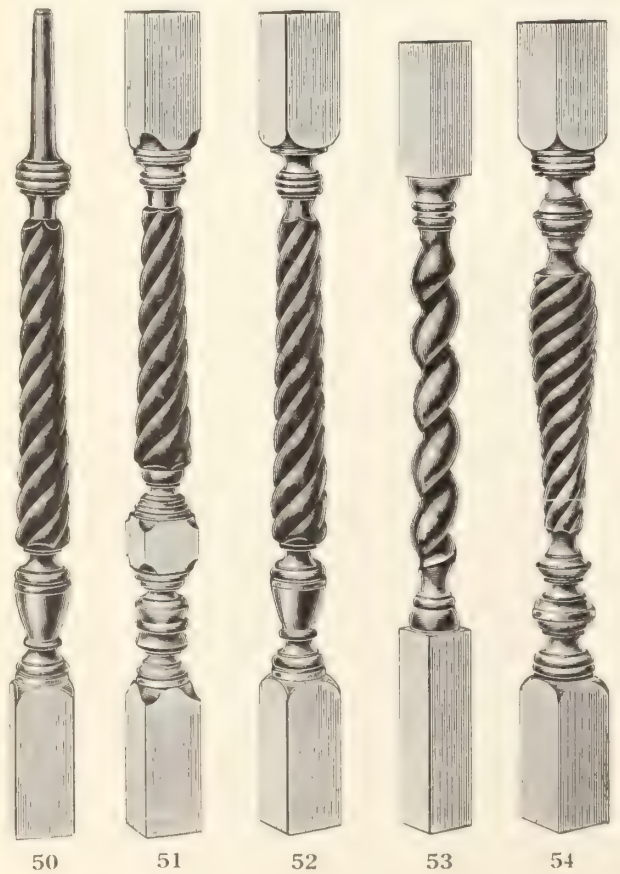
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that are cheaply made are dear at any price. To stand up under the strain of rough handling, a truck has to be first correctly designed and then **built to last.**

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are the easiest-running and longest-lasting that money can buy. Yet they **don't cost any more** than inferior trucks.

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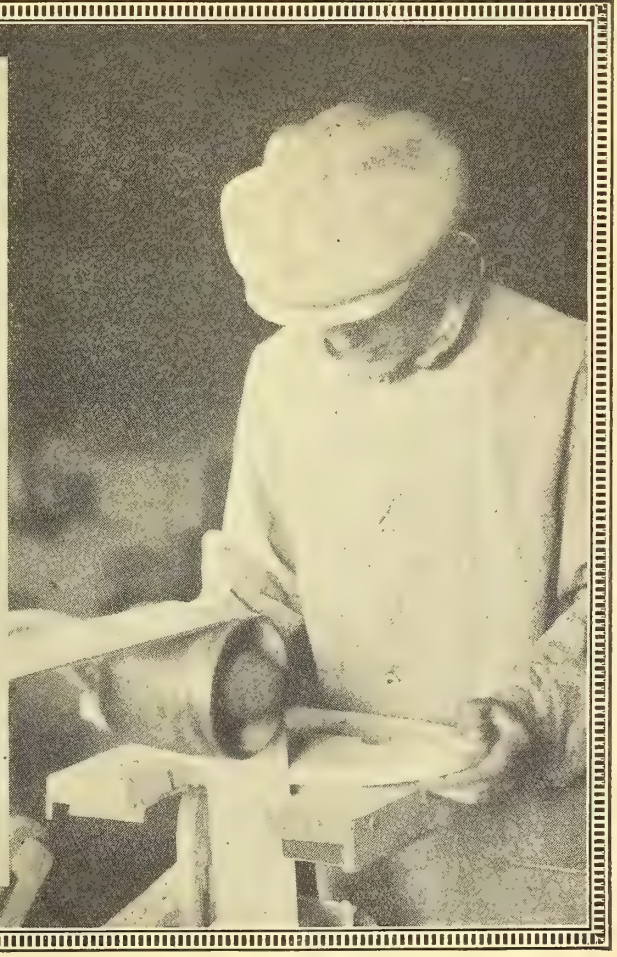

That finish is the best
which meets the final test
and the final test of every finish is actual service in the home.
The house-wife is the person you have to suit in the end, Mr. Manufacturer. She's the one who will determine whether your goods are one time sellers or repeaters.
If you want to build up a substantial business, use
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For woodwork and furniture in bedrooms and bathrooms. Has no superior for colonial stair effects. It can't turn yellow.
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MARIETTA WOOD FINISH SPECIALISTS

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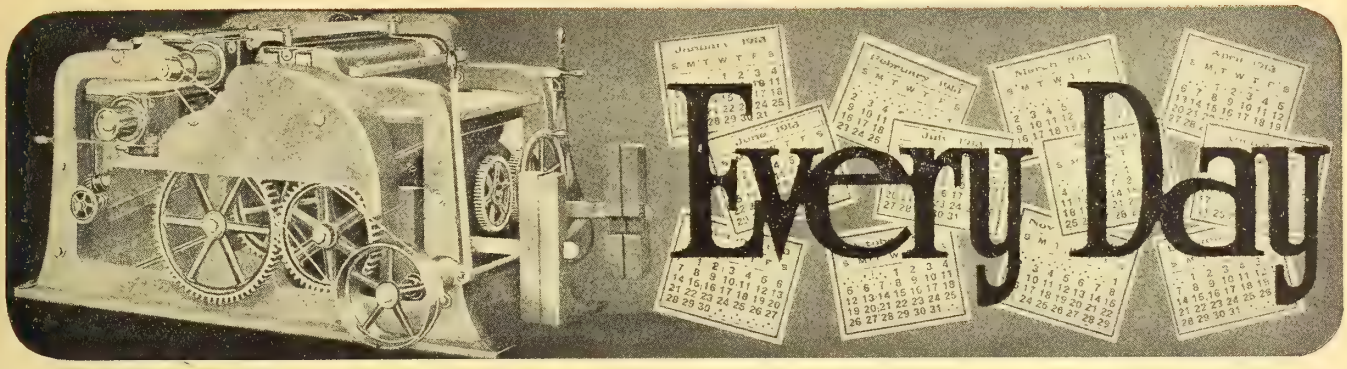

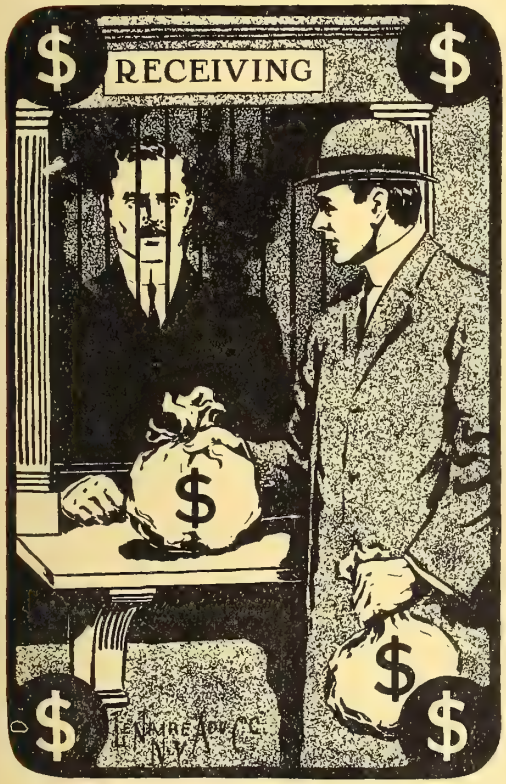

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The problem in the planing of lumber, single or double surfacing involves, in the selection of the machine for doing such work, three principal points :—smooth planing, speedy work and the all round strength of the machine that will stand up under continuous drive to the limit.

It is our way, the Whitney way, to show how you can derive a practical method of surfacing all kinds of lumber, whether it be soft or hard, and secure maximum daily earnings.

You have many sizes of Whitney Planers to choose from, both single and double surfacers, equipped either with square cylinders or round cylinders and furnished either with flexible steel pressure pads or steel sectional pressure bars.

A line to us now, to-day, brings indisputable facts.

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"Crown" Planer Belting

Built for heavy service and short bends over small pulleys

More than perfect construction and special tanning has made "Crown" the leading planer belting. The careful selection of hides obtained at the proper season is the foundation of a good belt.

The Tanned leather is carefully selected and no weak spots are allowed to enter into the manufacture of our belts.

The surface of "Crown" planer belting grips the pulleys and prevents slipping. "Crown" belting will solve any high speed heavy duty problems.

We have been tanners and manufacturers since 1876.

"Leather, like gold, has no substitute"

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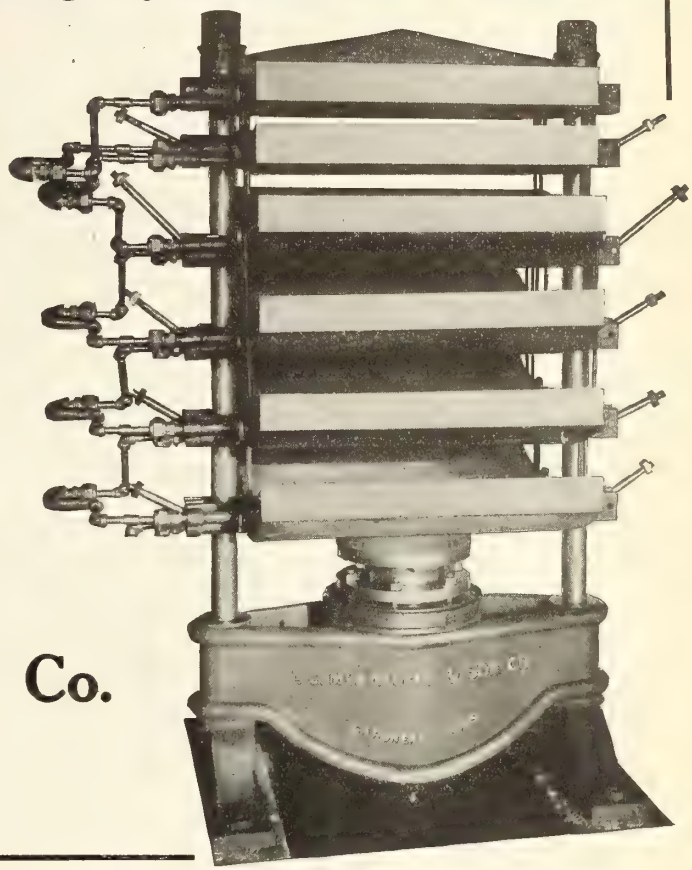
We also manufacture a complete line of Benders for handle factories, for round handles for pitchforks or shovel handles.

Prices and full particulars on our complete line of woodworking machinery given on application.



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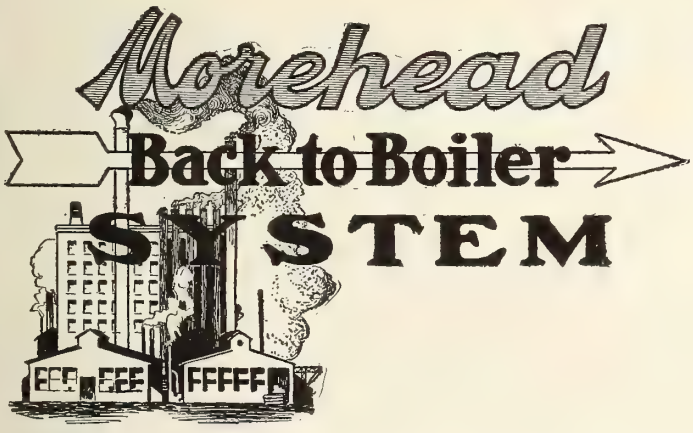
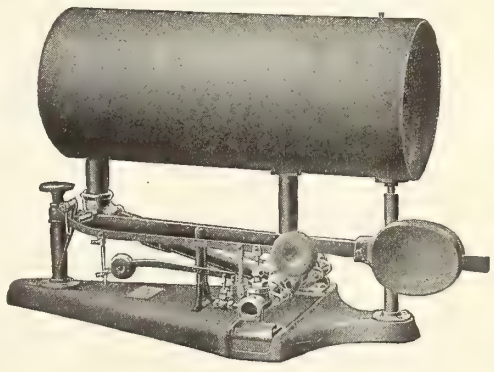
THE LOGICAL SYSTEM



Picking up the plant's condensation and returning it to the boilers without the use of pumps, without wasting heat—that's the logical way—the Morehead System.
For over twenty-four years it has been replacing troublesome traps, hot-wells, and pumps.
Speaking of hot-wells; every time you send good hot condensate to a hot-well you are sending it there to lose a large percentage of its heat units. And for every 100 degrees F. your hot-well gives up, you lose 10 per cent. of your fuel.
Did you know that?
The Morehead Back-to-Boiler System keeps your steam apparatus dry, hot, and increases the circulation. It feeds the condensate direct to your boilers at 290 to 300 degrees F.—it matters not how high the temperature, no heat units are lost.



Isn't it the most logical system to maintain the high temperature so necessary in the drying chamber? And it's so simple, too—so sure. Get acquainted with this expense-saving, profit-producing system. Know why it handles condensation quicker, hotter, cheaper, better. Our engineers will give you the complete information absolutely free.

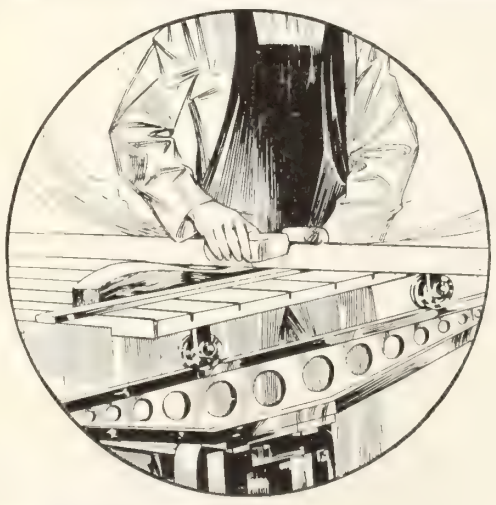
Write, right now.

THE CANADIAN MOREHEAD MANUFACTURING CO., LIMITED

WOODSTOCK, ONTARIO

A New Berlin Sander

Made in Canada



For flat or curved surfaces.
For irregular shapes and special jobs.
For getting at work impossible on other machines.
For saving cabinetmaker's time scraping.
For using special hand blocks shaped to the work.
For getting a better and more uniform finish.
For speeding up your sanding operations.
For insurance against spoiled stock.
For adding profits besides saving labor cost.

BUILT COMPLETE BY THE PIONEER AND WORLD'S LARGEST SANDER BUILDERS.

To Eliminate Your Expensive Hand Finishing

Pays its own cost in a few months.

No matter what other styles of sanders you're now using, this new machine will handle work you still have to sand by hand—those most expensive operations.

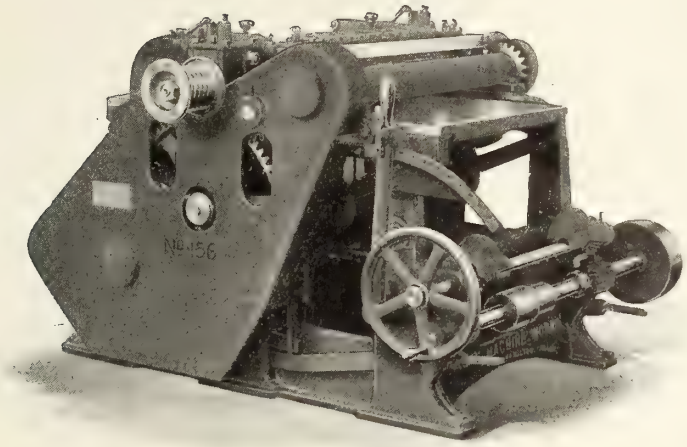
Whether you're using roll-feed sanders, sanding drums, discs, or one of the many types of so-called hand-block belt sanders, you'll find this new Berlin universal machine, with long, flexible belt the biggest time and money-saver on your work.

Here is a genuinely useful and practical manufacturing unit, that will add profits from a source you've never before experienced. Let us send you valuable detail information for your work in particular.

Address the Berlin Specialties Department about our Liberal Guarantee and Trial Plan.

Berlin Machine Works, Limited

U.S. Plant—Beloit, Wis. HAMILTON, ONT.



Compare Your Present Surfacer Equipment With This Berlin-Cabinet-Surfacer

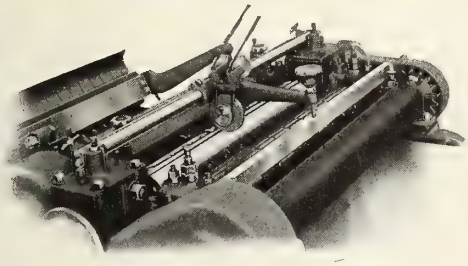
The Berlin was the first single surfacer to which thin knives, round heads and on-the-machine grinding device was applied. This was brought about by the growing need of a planer that would handle a large range of stock and produce a smooth finish that left little or nothing for the sander.

Such work resulted through the use of the round heads equipped with self-hardening thin steel knives. The direct advantage of this equipment, aside from its safeness, is that it gives a scrape cut identical with that used in finishing the finest woods by hand, and with least waste of stock produces a straight grain finish on cross-grained or twisted wood. The even pressure put on knives close up to the cutting edge assures a cut that will not tear grain around knots or clip the ends of short stock.

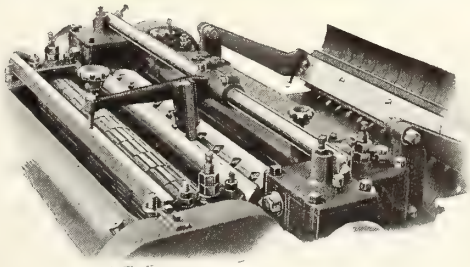
Sturdy construction is followed throughout the machine and permits of more dependable work at double the speed of the old thick-knived surfacers. The production is not only double, therefore, that of the maximum on the old machines, but by removing causes for the old accustomed stops that caused the knives to "dig" into the wood and prevented a smooth finish, the actual running time is made longer.

Now is the time when the saving which this machine effects will be most welcome, so now is the right time to write for particulars.

These set-grind-joint devices make better cabinet surfacing



Showing Grinder in position



Showing Jointer in position

A true cutting circle is obtained while the head is running full speed, so that each knife takes off a fine thin shaving. Such a cut enables using stock that otherwise would have to be thrown out or used for low grade products. A few minutes grinding daily without the necessity of breaking your setting, keeps knives in proper condition to turn out high-grade work all the time.

Hamilton, Ontario **Berlin Machine Works, Limited** **Beloit, Wis., U.S.A.**

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Long distance blows a specialty.

Trained Mechanics. We know how.

Consult our Expert

INVINCIBLE BLOW PIPE CO.

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Add 20% to Your Profits

If you are a user of veneers or built-up panel work and do not now use vegetable veneer glue in this work, **we can add 20 per cent. to your profits.** And in adding this 20 per cent. to your profit we enable you to turn out a better product, to do it with less work and without the odor and the heat that the use of hide glue must create.

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Originators and Patentees of Vegetable Glue

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Good Steel, Carefully Manufactured, Scientifically Tempered

Our **GLUE JOINT CUTTERS** Make a Perfect Joint.

MILLED SHAPER CUTTERS—Any Size or Any Shape. Ask for quotations.

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Manufacturers of the original

St. Francis Basin Gum

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We make a specialty of Yellow Pine Structural Timber, and can furnish either Long Leaf or Short Leaf.

We carry a full and complete stock of all kinds of Veneers, in Red Gum, Mahogany, Oak, Poplar, Yellow Pine and Birch.

Delany & Pettit, Limited

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The Exchange of Practical Information

QUITE recently we had the pleasure of discussing personally with a friend of ours, who operates a planing mill in Toronto, the belting question raised in our last issue. Our friend is a firm believer in the smooth side of a leather belt as possessing the greatest friction on the average pulley surface. Now, we happened to have visited his mill last year, and remembered seeing a pair of new planer belts with the flesh side to the pulleys. As this practice seemed inconsistent with his expressed opinion, we inquired the reason, and besides satisfying our curiosity in this connection our friend gave us a hint on the subject of controversies in general which we think is worth passing on to our readers. He said:

"It is impossible for any man to lay down in a single sentence a definite rule for the running of belts. I believe—in fact, I know—that the hair side of the belt has a better frictional grip of an ordinary pulley. The hair side is practically smooth and level, and is bound to fit closely over the whole surface of contact if the pulley is not too small. But when it comes to running a belt on sticker and planer cutter spindle pulleys, the belt will give the best service if the hair side is out. The short bending around the small pulley means that either the inside of the belt must be compressed or that the outside must be stretched, if the belt is to fit tight to the surface of the pulleys. I have been running belts for a good many years, and I know that in driving small pulleys it is better to drive them with the flesh side of the belt in.

"It is the same with all controversial points in woodworking practice. If there are diversities of opinion on any point of practice it arises through different applications of the same principle having been found necessary to fulfil different requirements, and it is nothing but bigotry for a man to take one side of a question and stick to it blindly without taking the trouble to consider the arguments in favor of the other side."

We are heartily in agreement with the words of our friend, and it seems opportune to lay some emphasis on the subject at this time, following the discussion in our last issue. In no case did any of our readers who took part in that discussion suggest that there is something to be said for both sides of a belt. Had we had an opportunity of talking the subject over with each one personally it is possible that we might have been successful in eliciting further information.

It must not be supposed that because there are two or three ways of going about the same job that it is useless to define one particular method. The thing to be borne in mind is that the methods applied on any one job must be governed by the attending circumstances, and in considering ways and means it is always well to indicate the conditions under which the methods will work out to the best advantage. In the keen competition of present-day business it is the little things that sway the balance of the manufacturer's accounts. Details have to be considered all the time: mere generalization is useless. Guesswork must be eliminated. Standardization of working methods in shop and mill practice is one means by which operating expenses can be cut—as witness the "little old Ford" and its makers. To arrive at standards requires co-operation, and it is in this connection that The Canadian Woodworker and Furniture Manufacturer proves its practical worth as an exchange for modern ideas relating to all features of Canada's woodworking industries. Read by most—and in close touch with many—of the woodworkers throughout the country, we are able to obtain opinions and information on every phase of the trade—information that, coming from men who have devoted much time and study to the work, cannot be otherwise than helpful. Apart from the belting discussion in the last issue, consider the First Aid Column which was instituted in the March issue. Since the first appearance of that subdivision of our Finishing Room department we have, in preparing answers to the various queries submitted, covered practically all the ground opened up by each communication, for the reason that we are in touch with so many practical men—not to speak of manufacturers—that although each one may deal only with the solution of a problem as it would appear under one set of conditions, in most cases each man considers the question from a different point of view. In consequence, when the answers are published it is unlikely that the inquirer cannot find a solution to his problem, even though he may not have been very explicit in submitting his query.

In this issue we publish a number of queries in the Question Box department. Instead of submitting the inquiries to one man, we are placing them before our readers, since it is altogether likely that there are sev-

eral who have had experiences covering the subjects raised. Thus, by getting the opinions of a number of men, we expect to be able to find ways of overcoming the difficulties of our inquirers that will apply under varied conditions.

No doubt it would be much easier if we could talk over the questions personally with our readers. Most practical men can talk of points in the trade better than they can write of them. Now, let us put it in this way: What would you say if a fellow woodworker asked you one or more of the questions submitted this month? You might sketch out a drawing on a board and explain the whole thing in twelve words. Well, that is all there is to do in this case. Draw your sketch on one piece of paper, and write the twelve words on another. We flatter ourselves that we are sufficiently well versed in the phraseology of the practical woodworker to present one man's statement in a form that can be understood by other practical men—in proof whereof we have only to point to previous questions and answers published in The Canadian Woodworker; they have been read and understood, and the hints contained in them have been acted on by the inquirers with good results.

We have stated previously that ours is a service journal, and we are only too glad to furnish information; but we alone are not capable of answering all queries: our place is to act as an exchange. If a reader receives helpful information from one issue, he may be able to reciprocate by giving equally valuable advice on some subject in another issue.

Owen Sound—A Woodworking City

THERE are larger cities than Owen Sound in the province, and many of them have a greater number of woodworking factories; but as an example of what may be termed a real woodworking town Owen Sound would be hard to beat. It is not only a woodworking city, but it is also one that is fully progressive in the trade. Its methods are modern, and its products are varied. Apart from the utilitarian aspect of its furniture manufactures, they are characterized by great beauty of design and variety of style.

Besides producing practically every kind of furniture, Owen Sound's output of woodwork includes a wide variety of products that come more under the heading of trade necessities, which are well known for the high quality of their manufacture.

Modern methods are coupled with the most up-to-date machinery obtainable in many of the lines, and in this issue we present illustrated descriptions of these factories. We were fortunate enough to obtain the co-operation of all the woodworking companies of the city, to whom our thanks are due. It may be added that in addition to the interest that an illustrated article always carries, there is a great deal of informative material in the account of Owen Sound's activities in the woodworking line—mainly on account of the progressive lines on which the factories are run.

Turkish Boxwood

NUMEROUS trees known as boxwood grow in various parts of the world, but there is only one Turkish boxwood, and it has become scarce. It has been planted all over southern and western Europe, but the wood grown there is lighter, and is inferior to the best that comes from the tree's native hills in Asiatic Turkey and Persia. It grows in the same region that produces Circassian walnut, in the country south of the Caspian and Black Seas. The tree seldom exceeds a height of 25 ft. and a diameter of 9 ins. Few logs are more than 6 ft. long; and the majority that reach market are 3 ft. or 4 ft. long, and less than 5 ins. diameter at the big end.

The wood is yellow. High-grade (not cheap) carpenters' rules are made of it, and the color never fades. No sapwood is used, for the very good reason that there is none. It is a peculiar wood in that respect. Many kinds of trees have little or no heartwood, but few lack sapwood. The boxwood may have a layer of sap of the thickness of writing paper.

Planted trees in Europe and America grow with fair rapidity, and the annual rings are fairly distinct; but on its native hills its growth is very slow and the yearly rings scarcely visible. The wood varies greatly in weight; some of it is little heavier than hard maple, other sinks at once if dropped into water. It is very hard, but does not measure up with lignum vitae or ebony.

Boxwood from the West Indies is replacing the Turkish article, except where the best is demanded. The two woods look much alike, but the West Indies trees are larger, and the wood is of less pleasing color.

Furniture for Export

The following letter has been received from a manufacturers' agent who is desirous of arranging for shipments of furniture from Canada. The name of the inquirer may be obtained from the Editor of The Canadian Woodworker.

25 Elm Grove, Southsea, England.
May 17, 1915.

Editor, The Canadian Woodworker,
Toronto, Canada.

I am open to take up a few agencies for Canadian furniture, and shall be obliged if you will kindly put me in communication with some of your manufacturers. I have been established in South Africa for the last eight years as a Manufacturers' Agent, representing manufacturers in the furniture and furnishing trades. I have an established connection among wholesale merchants and general house furnishers, and not only have I a thorough knowledge of the furniture trade, but I am intimately acquainted with all the principal buyers of furniture in South Africa, and I feel certain I can influence a considerable amount of business if I have competitive lines to offer my customers.

I am prepared to take up sole agencies on a commission basis of 7½ per cent., paying all my own travelling and out of pocket expenses.

All the firms with whom I do business in South Africa have a branch office or buying agent in London, who confirm, pay cash there, and take delivery in London of documents. I understand that in shipments from Canada or America the London agents would get the manufacturers to draw on them at sight cash against documents in London.

I am open for agencies in the following lines: Cheap chairs, dining tables, dining and drawing-room suites (frames only), cheap chests of drawers, organs, roll-top decks, cabinet-makers' joinery, turnery, and lumber.

I should like to receive catalogues from all the firms you put me in communication with, so that I may judge of the value and class of goods they make.

I shall be prepared to furnish references and further particulars to any firm who may entertain my proposal.

Yours truly,

Manufacturers' Agent.

Price Peddling in the Furniture Trade

By William G. Colgate

THE following letter, with its suggestion of hidden romance, evoked a more than ordinary interest in the sales department of the manufacturer who received it. But he was hardly prepared for the arrival of a letter from a dealer in another and adjacent town also advising him of the contemplated visit of the interesting couple referred to.

> I am giving my customer, Mr. ————, and lady, a letter of introduction to your showrooms. Kindly show them your line, and protect me to the extent of ———— on any purchases they may make, and oblige,
>
> Yours truly,

Plainly he was in a fix. He wished to be strictly fair to both of the dealers and to himself, and yet it was clear that the business could not be placed through both. So he did what any sensible manufacturer would have done—he wrote the first dealer, who was a regular customer, informing him of the peculiar position in which the arrival of the two letters had placed him, and asking frankly for advice. The dealer replied somewhat emphatically, it is true, yet fairly enough, as his letter shows:

> You may judge of my surprise when I learned from yours of the 20th inst. that a letter concerning Mr. ———— had been sent you by another dealer near here (I take it that he must be somewhere near here, though you haven't mentioned his name).
>
> You ask, "What am I to do in a case like this?" I wish you could put yourself in my place and answer, "What is the dealer to do?" It looks to me as if the customer in question had obtained your name from me in order to secure the letter of introduction from the other man, who, having no overhead or carrying charges to meet not handling the line himself, and consequently on it, is satisfied to accept a very slight margin of profit. Thus through my efforts the prospect is enabled to obtain a price considerably lower than he is entitled to.
>
> I may say that this is the second time within a week that I have been used in this manner, and it is my opinion that customers who act in this way—who put the dealer to a lot of trouble and inconvenience in showing them the line, and then go somewhere else to place the order on a basis of a 5 or 10 per cent. commission—deserve very short shrift from the trade. I shall know how to protect myself next time.

With a view to obtaining further information on the subject, and to ascertaining, if possible, to what extent the practice prevails, inquiries were made among the trade. Some of the answers elicited were most interesting and illuminating. That the nuisance is by no means confined to the small towns is certain; nor are those of limited means the chief sinners. As a case in point, the manager of the furniture department of one of Toronto's big stores, in conversation with the writer recently, related an incident which illustrates the extraordinary methods of these "price peddlers."

A young man of good appearance, clean cut and neatly attired, dropped into the store one day, accompanied by his wife. After a few preliminary remarks, during which he disclosed the fact that he came of a well-known family in a town not many miles from Toronto, he asked to be shown some dining-room furniture. He inspected several suites, and jotted down the particulars of each in a note-book which he carried.

Nothing seemed to satisfy him entirely. Finally he asked, "Have you any of ————?" (naming a certain non-advertised line). "This," remarked my narrator, "should have made me suspicious; but, somehow, the manner of the man, which was frank and engaging, inspired confidence, and I did not suspect anything out of the way. I then took him to another part of the room where we had a suite of this particular manufacturer's on view—it was a Jacobean style, by the way. They looked it over carefully, and seemed quite pleased with it; and, as I went on to describe its construction, style, finish, and so forth, they grew quite enthusiastic, admired it freely, and appeared quite convinced of its value.

"But when I made an attempt to close the sale there was a sudden and decided change. The husband replied that he would take the prices quoted under consideration and call back in a day or two. By this time, of course, I was thoroughly suspicious, and was angry with myself for having been such a fool as to be taken in by them. I considered the sale as good as lost, but I determined that the experience should be a lesson to me for the future.

"Strange to say, the pair did come back in a day or two, to see a special suite I had promised would have arrived by the time they returned. I saw here a chance to retrieve myself. I succeeded so well in my efforts that he asked finally who was the maker of the suite. I was not to be caught this time, so I answered, 'This furniture is made especially for us by one of the best firms in Canada, who make nothing but high-grade furniture.' He hesitated a moment, and then asked to be shown the suite which they had seen in the first place. On the way over to it I heard the woman whisper to her husband, 'But will the man in ———— be able to get it for us?' I didn't let them see that I had heard, but simply led them back to the original suite. But I might have saved my breath; I saw then that they had made up their minds to have this suite, and that to argue further would be useless.

"Finally they left me to go back home, and I have found out since that this particular suite was sold to them by the dealer in their home town, who did not carry the line in question, but sold from a catalogue for a commission of 10 per cent."

So far as can be determined, there are only two ways in which this abuse of which the out-of-town dealer and city manager complain can be checked effectually:—first, by manufacturers as a whole refusing to sell to dealers who do not carry at least a few pieces from their line, and, second, by dealers getting together and regulating prices. Before this latter move can be made, however, it will be necessary for someone—probably the manufacturer—to educate the dealer to a proper appreciation of what it costs him to

do business. I venture to express the opinion that very few furniture dealers have an intelligent idea of their overhead expenses, or keep any systematic account of their expenditures and income.

Very few dealers can carry furniture on their floors and sell it at an advance of from 10 to 15 per cent. without shaving their profit close to the vanishing point or losing it altogether. It is not gross profits, but net profits, that are to be considered, and this the dealer should be made to remember.

But if, in the meantime, manufacturers would decline business from retailers who go in for "commission" business without making any effort to carry the line, the "price peddling" evil would soon die for want of practical encouragement; and, what is better still, the manufacturer would protect his own immediate interests in protecting those of the dealers who carry his line, for, unless he is willing to stop up his channels of distribution, he cannot afford to ignore them.

And this much may be said for the benefit of the retailer with reference to his desire to sell the better class of goods (and all dealers of any account wish to carry high-class goods): if a selection of one or two pieces were made from each of the principal suites of a line, to show customers when they come into the store, they would find it easier than selling direct from a catalogue with nothing to show beyond the pictures and often very meagre descriptions which such books contain. From a dining-room suite could be chosen, say, a table or a sideboard, and a chair—from a bedroom suite, a bureau and a chair, or a toilet table and a bed.

The amount invested in this way would not be large, and, as the styles are carried in stock by the manufacturer, there would be no difficulty in making up the other pieces of the suites as they were required.

A well-posted, energetic dealer with a representative collection of good furniture on his floors, such as has been indicated, would not only be in a position to hold his own against outside competition, but he would also find himself influencing and developing a taste for a better class of furnishings in his community, with all that it implies in enhanced reputation, increased good-will, additional business, and larger profits.

In contradistinction to the attitude of the store just quoted, it is interesting to note that not all the stores take the same stand on the question. One of the foremost firms in Canada are pursuing at the present time a policy of permitting their salesman to mention the name of the manufacturer of their furniture whenever he is asked for it. And frequently the salesman will go so far as to supplement it with a complimentary remark of his own. But unfortunately this seems to be the exception and not the rule.

This, however, should be encouraging to furniture manufacturers who, rightly enough, cannot see why the product behind which they stand and on which they have staked their reputation should lose its identity and be numbered with the inferior class of nondescript stuff that floods the market.

Besides, if the advertising of the manufacturer is to do its work thoroughly and produce beneficial results, the identity of the advertiser must be preserved from the factory to the home.

It is a mistake to set saw teeth too wide. Not only is extra power required to drive the saw, but more wood is wasted in dust. The set should only be wide enough to give the saw plate the necessary clearance in the cut.

Cost Accounting for Woodworkers

By Jonas Howe

TO know the point at which profit ends and loss begins, a manufacturer must have his expense accounts classified to the accommodation of the cost system. With such an accommodation, each manufacturing department of a concern should put the management in a position to compare the cost of production with the charges made by each department to the sales or shipping department. Unfavorable conditions sometimes make it necessary for a foreman to lay off some of the direct or productive workmen. Under such circumstances the indirect expenses will not decrease in the same proportion as the direct expenses and subsequently the cost of production will become greater. After an examination of the monthly cost report, it may be seen that the cost of production is greater than it should be in some part. Some of the product is changed or certain expenses are transferred which may be better utilized elsewhere. A good cost system throughout a plant is continually the means of reducing or doing away with items of superfluous expense.

Expense made up of labor and material are classified as "direct" or "indirect." The direct expenses are consumed directly in the process of manufacturing and are chargeable to the productive jobs. The indirect expenses are not chargeable directly to the productive jobs and are sub-classified in order that a fair charge may be made by adding location rates to the direct hourly rates of employees to cover the operating expenses.

In most of our larger manufacturing enterprises, the cost system is dependent upon fixed percentages which the cost clerks figure on the productive labor to cover the indirect or non-productive expenses. This method of rating would be altogether impracticable in a woodworking plant. Instead of having a fixed percentage to add to the hourly rate of each productive operator, it would be more effective to have the expense rates for the various machines or benches—"locations."

In this system the operator's pay-roll hourly rate, and the hourly rate of his location are added together. If an employee works on a certain job at a certain machine, and his pay-roll rate is 30 cents per hour and his location rate (machine or bench expense) is 16 cents per hour, by adding these together we have 46 cents per hour, which is equivalent to the manufacturing expense in the process of that specified part.

The general upkeep, known as the general overhead or general indirect expense, is that part which cannot be charged to a department or a location. Therefore it is not proper to make allowance for this indirect expense in the location rates. The direct labor rates plus the location rates will give the cost of manufacturing, but the general indirect is not controlled by the factory.

When a large part of the business is done apart from the factory through salesmen or shipping clerks in the selling of lumber, in the rough, or imported merchandise, it can be readily understood that this portion of the business is done under the same general indirect expense as the manufacturing product is. Therefore the general indirect may be formed into a percentage based on the general indirect expenses in comparison with the cost of the whole business. The proportion of the general overhead should however be made the subject of careful and expert analysis.

OWEN SOUND, ONTARIO

Particulars of the Woodworking and Furniture Industries in this Progressive City—Illustrations of the Product of Some of the Factories

OWEN Sound, Ont., is a woodworking centre in the true sense of the term. With a population of about twelve thousand, it has six factories engaged in the manufacture of wood products, besides a number of saw-mills cutting lumber. We propose to confine ourselves to a description of that portion of Owen Sound's woodworking industries which comes under the heading of factory work, as seen in a recent visit to the city.

Four of the factories make furniture exclusively, and three of these specialize in their lines. The North American Furniture Company, Limited, who have the largest factory in the town, make a full line of medium and high-grade case goods, while their near neighbors, the Owen Sound Chair Company, Limited, make chairs only. The National Table Company, Limited, produce a complete line of library, dining and other tables; and the North American Bent Chair Company, Limited, devote their energies to the production of large quantities of bentwood chairs in the cheaper lines. Besides the furniture factories, there is the large planing mill of John Harrison & Sons Company, Limited, which produces several specialties, in addition to the ordinary run of planing mill work. The woodenware branch is represented by the Keenan Woodenware Manufacturing Company, Limited. At their plant they manufacture a line that covers practically everything that comes under the heading of woodenware.

John Harrison & Sons Company, Limited

A Planing Mill Which Has Extended Its Output Beyond the Ordinary Mill Work

THE oldest established lumber firm in Owen Sound, Ont., is that of John Harrison and Sons Company, Limited, which was established in 1869 and incorporated in 1899. They have saw-mills at Owen Sound and Algoma Mills, and at their planing mill in Owen Sound they turn out, besides the usual building lumber and sash and doors,

A general view of the mill and yard.

a number of specialties, including hardwood flooring, meat skewers, and tie plugs. They have a lumber mill at Algoma, Ont., and usually about six million feet of pine and hemlock logs are floated down the lake every year and sawn at the Owen Sound mill. The Algoma mill is devoted principally to the sawing of hardwoods, and the sawn lumber is shipped to Owen Sound and piled on the storage docks. The yard, mill, and dry kiln are connected by a system of tracks in order to facilitate the moving of lumber from one place to the other. In place of the usual cross-transfer cars for moving kiln cars along the front of the kilns, turntables are used at intersections, so that the kiln car can be taken by itself in any direction. The power plant in the planing mill consists of a Goldie & McCulloch boiler and a 300 h.p. Wheelock engine. A separate small engine is provided to drive a generator to feed the electric light system of the factory. All the shavings and sawdust are drawn from the machines by an exhaust system and delivered straight into the furnace without any intermediate handling. The waste question has been cut down pretty fine in the plant of John Harrison & Sons Company. All the shavings and dust are used as fuel, and the edgings are used up on a special set of machinery and made into plugs for railroad ties. These plugs are used to fill the hole left in the tie when the spike has been withdrawn.

The heavy machinery in the planing mill consists of a Berlin matcher, Berlin double surfacer, two Berlin moulders, S. A. Woods hardwood flooring machine, and two McGregor-Gourlay band resaws. Hardwood flooring is made from winter-sawn hard maple and Canadian birch and United States oak, side and end-matched and bundled. The tracks in the mill are arranged so that whenever lumber is taken from the kiln or from the piles it can be run up to the machines on the car.

The machine for making the tie plugs is also situated on the ground floor. This machine was built by John Harrison & Sons Company specially for the purpose, and it uses up all edgings from the rip saws. These edgings are sized and stored in bundles until required.

On the second floor there is a fully equipped sash and door shop, including a four-head sticker, sash

Dry kiln and planing mill.

sticker, tenoner, power feed mortiser by the Canada Machinery Corporation, three-drum sander, Berlin shaper and a radial arm-sander for sash. Just off the machine room is a room for putting together the doors and a large storage shed for doors, sash, etc. Another room on this floor is devoted to finishing work and

storage for special work. At the other end of the machine room, on the second floor, there is another set of machinery employed in the manufacture of meat skewers, which machinery was also built by the company. A double-headed sticker takes the sized maple and converts it into dowels, which are cut off long enough to make two skewers. These lengths are pointed at both ends, cut in two and packed in paper boxes.

It may be mentioned that while John Harrison & Sons Company operate their saw-mill and planing mill on the west side of the river near the Grand Trunk Railway at Owen Sound, they have also a tie mill on the Canadian Pacific Railway across the river. In a normal year their total cut is about ten million feet. Their full line covers all kinds of timber, joisting, studding, lumber, laths, shingles, hardwood flooring, doors, sash, interior trim, silos complete, creosoted and set up on concrete foundations, dimension timbers, ties, tie plugs, and skewers.

The present officers of the company are: E. J. Harrison, President and Manager; A. N. Harrison, Vice-President; J. E. Harrison, Director; F. W. Harrison, Secretary; and J. C. Miller, Treasurer.

The National Table Company, Limited

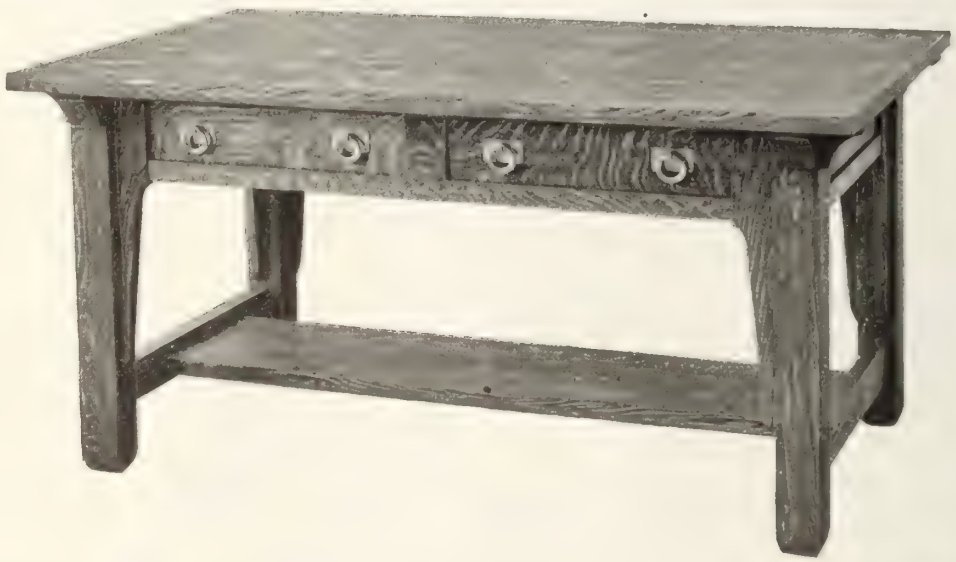
Good Results Obtained from a Compact Layout—A Time-Saving Finishing Room Process

TABLES in all styles, for every use, are the almost exclusive product of The National Table Company, Limited. The styles made by them include massive extension dining tables with round and square tops, period styles particularly adapted to the library, and all kinds of smaller tables for writing and smoking rooms. The woods used are mainly plain and quartered oak, with some mahogany and walnut.

The National Table Company's plant is situated at the northern end of the town, on the Canadian Pacific Railway. An exterior view of the factory—which is on the square plan, of brick construction, and three storeys high—is shown herewith. No space has been wasted in the laying out of the machinery; every inch of space is used, but without crowding, and thus all work is greatly facilitated on account of the close proximity of the machines for successive operations.

The National Table Company was formed about fourteen years ago, and it has developed a complete line of tables of every style and finish, the library tables already mentioned being particularly worthy of note.

The three floors are devoted respectively to machine room, cabinet shop, and finishing department. All



The factory of the National Table Company and two samples of its products.

wood waste is burned under two Goldie & McCulloch boilers, which supply steam to a 125 h.p. Wheelock engine.

The factory is provided with its own electric light system, driven by an individual steam engine. It is equipped throughout with automatic sprinklers. As an extra fire precaution, a large direct-acting fire pump has been installed to pump water direct from the Sound to the fire-fighting system of the factory. A dry kiln with a capacity of 125,000 feet is employed in drying all wood before use in the factory. This kiln is of the moist air type. All wood is cut to the required sizes by crosscut and power-feed rip saws of the best makes.

Further operations in preparing lumber for the cabinet-maker are done on a McGregor & Gourlay planer, Cowan jointer, Preston Machinery Company twelve-inch sticker, Falls pattern continuous-feed glue jointer, 36-in. Whitney surfacer, Cowan three-drum sander, Jackson & Cochrane shaper, Ballantine double cut-off saw and trim saw, and boring machines by The Canada Machinery Corporation. On account of the compact arrangement of the machines, there is no loss of time or waste in moving stock up to the second floor, which is devoted entirely to cabinet-making and bench work. A Moore belt sander on this floor takes care of the sanding of tops after being assembled, and is also used in finishing off all flat work. A disc and drum sander is provided for finishing smaller work, such as drawers.

All the finishing is done on the third floor of the building. Much of the period work which forms a feature of this company's output includes fumed finish, and for this purpose a fume box has been built. The National Table Company have saved a considerable amount of time in the process of finishing by the use of a Standard varnish drying room designed and made by The International Varnish Company, of Toronto. The room is heated by steam, and the temperature is controlled automatically by a thermostat valve. The temperature is kept at 104 deg. F., and should it drop from any cause, such as the opening of the door, the lowering temperature opens the steam valve until the normal level has been reached again. By the use of this drying room a piece can be stained and shellaced and the first coat of varnish applied on the same day, each coat being dried before the next is put on. The first coat of varnish is applied the last thing, and the piece placed in the room and left overnight. The next morning the second coat of varnish is applied. The quality of the finish is not impaired in any way by this method of drying; on the contrary, as each piece is dried under the same conditions, results can be gauged accurately, and besides this considerable time is saved in the whole process. The use of a drying room such as this illustrates the progress of wood manufacturing in all its branches, from dry kiln to—in this case—another dry kiln, or drying room.

Mr. W. H. Merritt is Managing Director of The National Table Company, and Mr. W. J. Beattie recently joined the staff as Superintendent. Mr. Beattie will be known to our readers as a former Superintendent of the factory of Canada Furniture Manufacturers, Limited, at Woodstock, Ont., and more recently of their Waterloo factory.

The North American Furniture Company, Limited

Modern Equipment Facilitates the Manufacture of a High Class of Furniture—Power Plant Economies

OWEN Sound's largest and most up-to-date woodworking plant is that of The North American Furniture Company, Limited, situated on Fourteenth Street West, between Second and Third Avenues West. The outward appearance of the factory, which is of brick and stone construction, gives a most reliable indication of the efficient and businesslike way in which the whole of this manufacturing concern is conducted. Although the company is closely connected with the Owen Sound Chair Company, Limited, and both are under the management of Mr. H. B. Smith, the two factories are operated as independent units, each having its own yard, dry kiln, and power house.

The North American Furniture Company was organized and the factory built four years ago. The main factory is of stone and brick construction, four storeys high, 420 feet long by 60 feet wide. One of the most striking points to any one entering the factory is the height of all the ceilings and the absence of dust either in the atmosphere or on the floors. When the factory was built no effort was spared to get the best that was to be had in the way of factory construction and machinery. Mr. Smith, together with Mr. J. A. Minchner, Superintendent of the furniture factory, and Mr. F. W. Harris, Superintendent of the chair factory, spent two or three weeks investigating many types of woodworking machinery in the actual course of manufacture. The careful selection they made is reflected in the economy of production and the high quality of their goods. The finishers in this plant do not have to apply stains and varnishes for the purpose of hiding defects in manufacture; instead they are provided with excellent surfaces on which to work, and they produce some very fine effects.

The power plant represents the most modern practice in the way of fuel economy. Every pound of fuel is made to do its work, whether coal or wood refuse—though it is well known that a furniture factory does not make sufficient shavings and sawdust to keep the boilers going, as does a planing mill. There are three Goldie & McCulloch boilers in the power house of the North American Furniture Company, which are fed directly from the cyclone of the exhaust system. Power is derived from a Polson-Brown engine developing 350 h.p. The Webster heating system is in use. Exhaust steam from the engine is drawn through the heating system of the factory by a small pump which delivers the steam to a superheater. After being superheated to a temperature of about 216 deg. F., the steam is returned to the boiler. The heating system comprises sixteen miles of 1¼-in. pipe. A small steam engine and generator provides electric light for the factory. Boiler troubles are prevented by the use of a feed water cleaner, which removes all grease and other impurities from the water.

The output of this factory consists of a full line of medium and high-grade furniture for the dining-room, hall, bedroom and library, in mahogany, Circassian walnut, American walnut, and plain and selected quar-

tered white oak. A considerable stock of valuable hardwood is kept on hand in the yards, and a kiln with a capacity of 275,000 feet is used for the purpose of drying. The kilns are placed between the factory and the storage yards, and the trucks in the kiln are run on a slight grade towards the factory end. The cars are loaded at the outer end, and as the lumber is

An attractive dresser by the North American Furniture Company.

taken into the factory from the front end the cars are allowed to move down the slight incline and another car is loaded at the back. Few cars are piled with less than eight crossers between each tier.

At the point where the lumber comes into the factory from the kiln are several cut-off and power-feed rip saws, furnished by The American Machine Company, Rochester, N.Y., which get out the required sizes. Further operations are taken care of by American planers and double surfacers, and a four-sided sticker. A Porter buzz-planer with a Billstrom power-feed is used for straightening the flat surfaces of warped stock before planing. All stock for glued-up work is jointed on a Falls continuous-feed glue jointer. A set of Billstrom revolving clamps are used to clamp up the glued work. The edges of the stuff are glued on a small roll revolving in the glue tank. As one clamp is filled up it is turned up by power, and another one comes into position. By the time the clamp originally filled comes into position at the front of the machine the work in it is set sufficiently to be taken out. This is just an indication of the efficient methods employed throughout the plant. An American re-saw, three-drum sander, shaper, double-end tenoner, and double cut-off saw and Dodds dovetailer complete the machine equipment on the first floor. The veneer department is equipped with a veneer storage room and Chas. E. Francis machinery in the way of a hydraulic press, screw press and glue spreader.

The cabinet work is done on the second floor, and it is here that some of the beauty of the work becomes apparent. Two elevators are in use to transport material from one floor to another. The third and fourth floors are devoted to finishing, trimming and packing, and also to the storage of considerable quantities of goods carried in the white, ready to be finished in any style that may be needed. All staining and varnishing is done on the fourth floor, and the rubbing is done on the third floor after the varnish has been given ample time to harden.

Two more instances of modern practice are to be seen in the finishing room of the North American Furniture Company. Varnish is applied by the De Vilbiss Aeron system, operated with compressed air at eighty pounds. This system was installed in 1914, and the results obtained have been most satisfactory. The installation carries with it a full complement of accessory equipment, and no matter how the finishes vary, or whether the product is of medium or of the highest grade, we understand that the finishes can be applied more quickly, more evenly, and more economically than by any other means. A powerful fan is used to draw away the stray particles of varnish, and although the air pressure causes a certain amount of loose spray we understand that the waste of varnish by this method is not so great as by the brush method. Certainly it is quicker, and productive of better results. We saw the spray in operation on the interiors of drawers, and for this use it seemed to have considerable advantage over the brush method. The drawers were coated evenly without having the corners filled with surplus material.

A buffet in oak by the North American Furniture Company.

The compressed air system is supplied by a Curtiss steam-driven compressor, and another tool operated by this air is a Curtiss pneumatic rubber, which consists of a 35-lb. metal casting with two felt pads underneath which reciprocate and produce a rubbing motion on the surface to be finished. As the motion of the pads is always opposite one to the other, they

do not move the whole machine, and the operator has no trouble whatever in guiding it over the surface. The whole of the factory is fully protected by an automatic fire sprinkler system, and hose houses are provided in the yard. Water pressure is obtained from a large woodstave tank placed on the top of one of the elevator shafts.

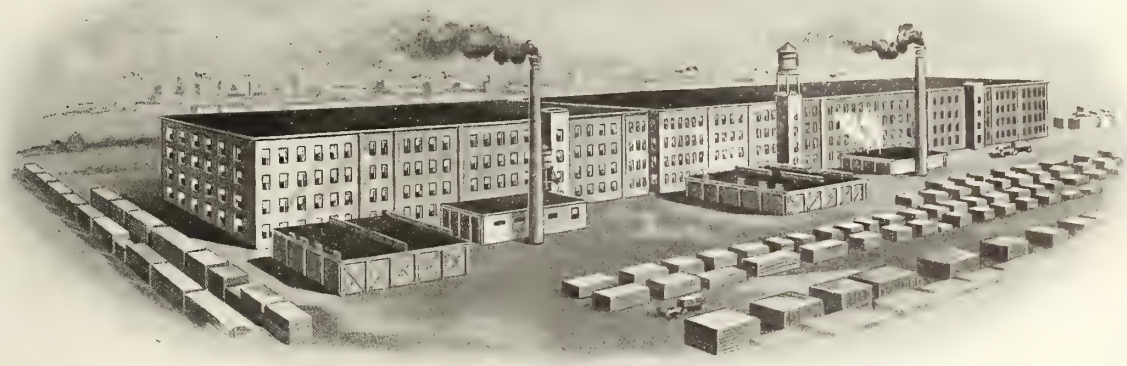
In normal times the North American Furniture Company, Limited, employ about two hundred and fifty men.

The Owen Sound Chair Company, Limited

Some Interesting Features of a Factory where Medium and High-Grade Chairs are Produced

A separate factory on the west side of that occupied by The North American Furniture Company is that of The Owen Sound Chair Company, Limited. The factory is a four-storey building, 240 feet long and 60 feet wide, and was erected about three years ago, when the company was formed. The design of it is similar to that of The North American Furniture Company, although operated independently with its own manufacturing units. Like the adjacent furniture factory, the chair factory was built with a view to giving pleasant surroundings for the workers, by providing ample light and air, and by keeping the air free of dust.

The Superintendent of the chair factory is Mr. F. W. Harris, and he has kept his part of the plant quite up to the standard of the larger factory. The output consists of high-grade chairs in all styles and finishes, chiefly of plain and quartered white oak, mahogany, Circassian walnut, and American walnut. Chairs are made for the dining-room, bedroom, hall, library, and den. Office chairs and children's high chairs are also made to some extent.



The factories of the Owen Sound Chair Company on the left, and the North American Furniture Company on the right.

A Goldie & McCulloch boiler, using wood waste from the exhaust system, supplies steam to a 175 h.p. engine. As an indication of the completeness of combustion in this plant, we may mention that the 87½-ft. concrete smokestack is rarely seen to emit black smoke, and the top of the stack is not discolored for any great distance. The same can be said of the stack of The North American Furniture Company. The factory is heated by the Webster system, which includes about twelve miles of 1¼-in. steam pipe. The electric light system is fed by a small belted generator driven by a separate steam engine.

Besides the lumber piles in the open in the yard, sheds are provided for a large quantity of square dimensioned stock, specially sawn for chair legs. For drying the lumber a kiln with a capacity of 175,000 feet is situated between the factory and the piling yard. The cars are placed upon a stage at the outer end of the kiln, and loaded from the yard; then they are run into the kiln and moved forward as succeeding carloads are taken from the end of the kiln into the factory for manufacture. The tracks in the kiln are laid with a slight downward grade towards the factory, so that little labor is required in moving the cars forward in succession. Between the kiln and the factory is a covered platform on which the lumber stands for cooling before going into the cutting room.

Cutting is done on several power-feed cut-off saws and power-feed rip saws, all supplied by The American Woodworking Machinery Company, Limited, of Rochester, N. Y. Further machine work is done on a Falls continuous-feed glue jointer, American shapers and trim saws, and a Porter jointer. The operation of chair-back bending occupies a small room off the main floor. The other floors are all served by an elevator devoted to bench work, packing and trimming, and finishing, respectively. The bench or assembling room of a chair factory differs in some respects from the cabinet shop of a case goods factory, in that the parts do not require so much fitting, but on account of the irregularity of the average chair the frame calls for some ingenuity in holding the parts together for assembly.

In the finishing room, also, the methods are slightly different in connection with chairs. Most of the staining is done by dipping in tanks. It is interesting to note that in the finishing room of The Owen Sound Chair Company these tanks are provided with hinged covers which are held open by a cord and counterweight on an overhead pulley. The cord is connected

with the cover by a fusible link, so that in case of fire the lid will fall automatically. The entire factory is protected with a complete sprinkler system, and water pressure is obtained from a tank on top of the elevator shaft.

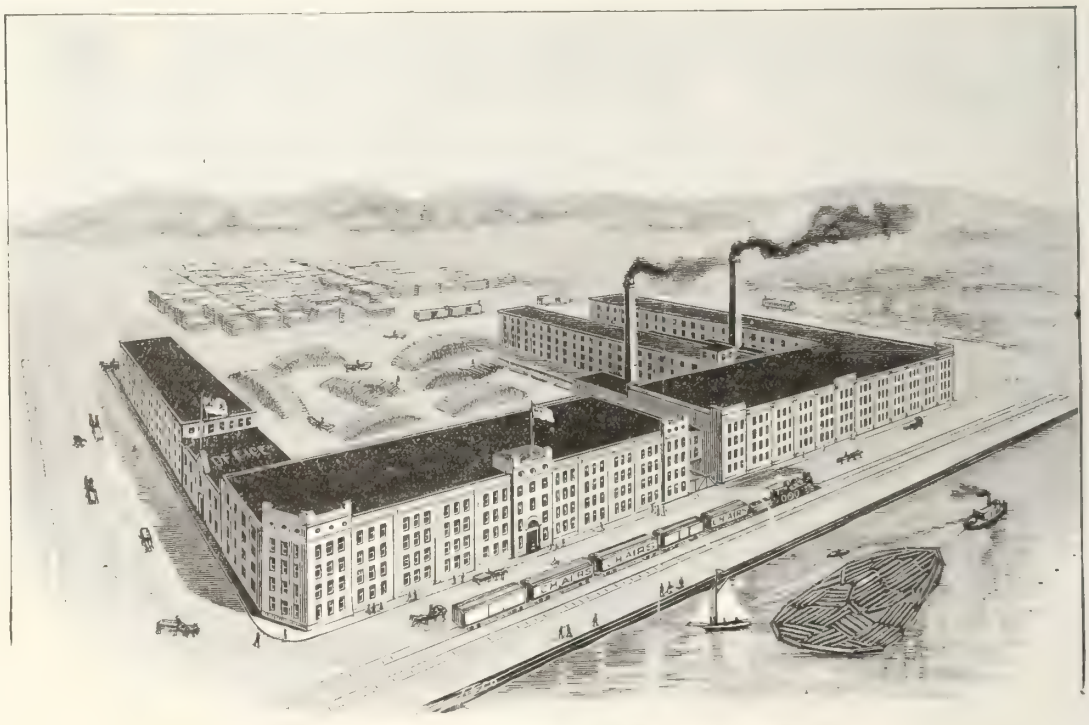
On the third floor are shown samples of every type of chair made by the company, from nursery high chairs to high-class upholstered period designs and substantial office chairs.

In normal times the chair factory employs a staff of one hundred and fifty persons, and although the present trade depression has affected the business in some measure the work is distributed so as to give employment to as many men as possible.

The North American Bent Chair Company, Limited

Where Immense Quantities of Bent Chairs are Manufactured for Domestic Use and Export

OF special interest to the "Made-in-Canada" enthusiast is the plant of The North American Bent Chair Company, Limited, who have been successful in manufacturing bent chairs that are an improvement on the Austrian bentwood chairs, and who have captured a large portion of the trade with Great Britain and other countries that was formerly the monopoly of the Austrian manufacturer. The firm was established in 1891, by Messrs. J. G. and A. B. Hay. Although they have been engaged in making bent chairs ever since they started business, it was only recently that they began to manufacture chairs similar to the Austrian designs. Any one visiting their factory and noticing the line of stock they carry would think that there was little necessity for them to duplicate the patterns of foreign makers. The extent of their business is considerable, and the designs are constantly being changed; as soon as one loses its popularity it is discontinued, and two or three other designs take its place; the market for different patterns of this class of chair is almost as fickle as are the fashions of Paris. Their designs include special patterns such as one sees in the "one-arm lunch rooms," and also folding chairs for steamers. Much of their output is exported to Australia, South Africa, Great Britain, East and West Africa, the West Indies, and New Zealand. The recent changes in the Australian tariff have been detrimental to the export trade to that country. The company's line is a very complete one, and the cheaper classes of chairs, even in the lighter designs, are notable for their rigidity. Although, like other firms, they have found their business adversely affected by the War, they have been able to keep practically the whole of the factory in operation. Their normal force of workers numbers about three hundred.



The factory of the North American Bent Chair Company.

The company's factory is a four-storey building, of brick construction, situated between Fourteenth and Fifteenth Streets West, and between First Avenue West and the Grand Trunk Railway and Shipping Dock of Georgian Bay. The first floor is devoted to a sawmill, cutting department, veneer department, bending department, making up of solid seats, lathe room, packing room, and rubbing department. The company cut a considerable number of logs from their own limits into lumber and veneers for their own use.

Power for the main plant is supplied by a Polson engine of 200 h.p. and four Goldie & McCulloch boil-

ers; and the electric light plant is also in the power house.

From the saw-mill, lumber goes to the kiln for drying, and thence to the cutting department, where it is sawn up into the various sizes required. The seats are jointed and glued up, and the spindles are sawn and go down to the gauge lathes at the other end of the department. All work for bending is sized and dressed and trucked into the bending room, where it is steamed and bent around forms, clamped together, and allowed to dry in position. Nearly all chairs of their design include bent work, although generally the bent parts are not turned in addition. All the wood is steamed before bending, and in this connection it may be said that the chief difficulty in the production of the Austrian designs are the short bends at the top, which are always apt to break. This

Merritt veneer lathe.

with a Merritt rotary peeler and a drying room. In connection with this also there is a small mechanical glue spreader and screw press for making three-ply stock for chair seats. The factory includes a complete machine shop, fully equipped for repairing and building all kinds of special machinery, which is for use in the factory.

A large area on the first floor is taken up by the shipping room. Here all carloads are assembled, and

Replacing the Austrian bentwood chair—Three of the North American Bent Chair Company's latest designs.

required a good deal of experimental work before successful results were obtained, but now that it is possible to produce this type of chair, Great Britain, as well as other countries, affords a good market. A battery of hydraulic steam heated back bending presses are in use in addition to some screw presses used in bending special shapes. In the slat presses the wood is placed between several shaped iron plates kept hot by steam. When the press is filled and the pressure applied the steam is turned on and the stock allowed to remain in the press until thoroughly dried and set. In bending with the screw presses the stock is bent around solid forms, and retained with outside bands and clamps, which can be taken from the press and left on the wood until set. The cutting department includes rip and cross cut saws, shapers, glue jointers, etc. A considerable number of gauge lathes are employed in turning spindles.

A complete veneer cutting department is equipped also cases made up for export. The chairs are not rubbed until required for shipment, so that all varnish has ample time to harden thoroughly. After rubbing, such chairs as are to be shipped abroad are knocked down and packed in cases. This is where the cores from the veneer lathes are used up. The cores are sawn into boards, which are afterwards cut to size to make up packing-cases. Quite a number of chairs can be got into one packing-case when knocked down.

Nearly all the sanding and bandsawing is carried on on the second floor. A number of bandsaws are used on the curved work in this department. Most of the sanding machines consist of belts running over various pulleys to adapt them to the needs of the different work being done; in fact, two or three consist merely of sand belts running over a pulley on a countershaft, and an idler pulley under the floor. No rest or pad is provided, but the wood is just held against the belt in the hands, and even an ordinary workman

can sand a wide variety of chair work with this type of rig. For spindle sanding, two spindle sanders are used. The machines carry the spindles past a sand belt. As the spindle is fed forward it revolves, so that in passing the belt it is sanded clear around. In any case, chair work is mostly curved, and the chair factory contains practically every type of machine for producing curved work, either by bending, bandsawing, or turning. Sometimes a combination of any two on one piece of work is adopted. Other machines are the multiple boring machines, which will bore four, eight and twelve holes at once, at varying angles. One room on this floor is given over to the weaving of cane for chair bottoms and backs.

After all the pieces are sanded they are passed on to the benchmen for assembling, the solid chairs going to the third floor and the bent chairs to the top floor. Several of the benches are provided with an overhead rig carrying two boring bits and a screwdriver, all power driven. When a screw-hole is required it is only necessary to hold the wood against the revolving bit, and when the screw is inserted it can be held against the screwdriver, which normally does not revolve. The pressure of holding the screw up to the bit engages a clutch, and the screwdriver revolves as long as the pressure is kept up. Of course, this method of making screw-holes and driving screws is better adapted to chair work than to other furniture, on account of the lightness of a chair compared to other pieces of furniture, such as tables or dressers.

The finishing room is situated at one end of the top floor, and is provided with a fume box and dipping tanks. Nearly all the staining and varnishing is done by dipping. Some of the bent chairs are finished with a fume stain, which gives them every appearance of walnut when finished. This finish is one of the most popular in the English market.

The company's export trade makes considerable extra work in packing, each chair being taken apart and the corresponding pieces numbered with a punch. The whole thing fits so tightly that the last few spindles sometimes requires careful persuasion with a mallet before they will enter the case.

The present officers of the company are: J. G. Hay, President; W. G. Hay, Vice-President; H. Bovell, D. A. Hay, J. M. Hay, and James Garvie, Directors.

The Keenan Woodenware Manufacturing Co., Limited

Logs Converted into a Wide Variety of Articles in a Single Plant

AN enterprising industry is that of The Keenan Woodenware Manufacturing Company, Limited, who make practically every article that comes under the heading of woodenware—including wooden pails, wash tubs, lard pails, candy pails, fruit boxes, berry boxes, banana crates, meat baskets, veneers, red cedar chests, toothpicks, and skewers. They make all their goods straight from the log, except in the case of red cedar chests. They use pine, basswood, and most hardwoods. Pine and basswood are used for pails, while hardwood is made into veneers at the first operation, and in turn is used for the various baskets and berry boxes, the making of which forms one of the most important departments of the firm's operations.

Being occupied in the manufacture of packages for food products, this firm's business has not suffered from the War to such an extent as have furniture factories and planing mills. People may cut down on their purchases of furniture, or refrain from building a house, in such times as these, but they must continue to use foodstuffs in practically the same quantities as before, and therefore such industries as The Keenan Woodenware Company's can continue to dispose of their output.

The Keenan factory is a two-storey brick building between the water-front and the Canadian Pacific Railway tracks, near Third Avenue East. Practically, the log is hauled out of the water, converted into baskets or pails in its course through the factory, and goes out at the other side of the factory and into the cars. Power is derived from three Goldie & McCulloch boilers, which burn wood refuse carried from the factory by endless chain and belt conveyors. The main power unit is an engine of 200 h.p., and in addition there is a small engine belted up to a generator for supplying the electric light system in the factory. A large direct-acting fire pump and a complete system

The factory of the Keenan Woodenware Manufacturing Company.

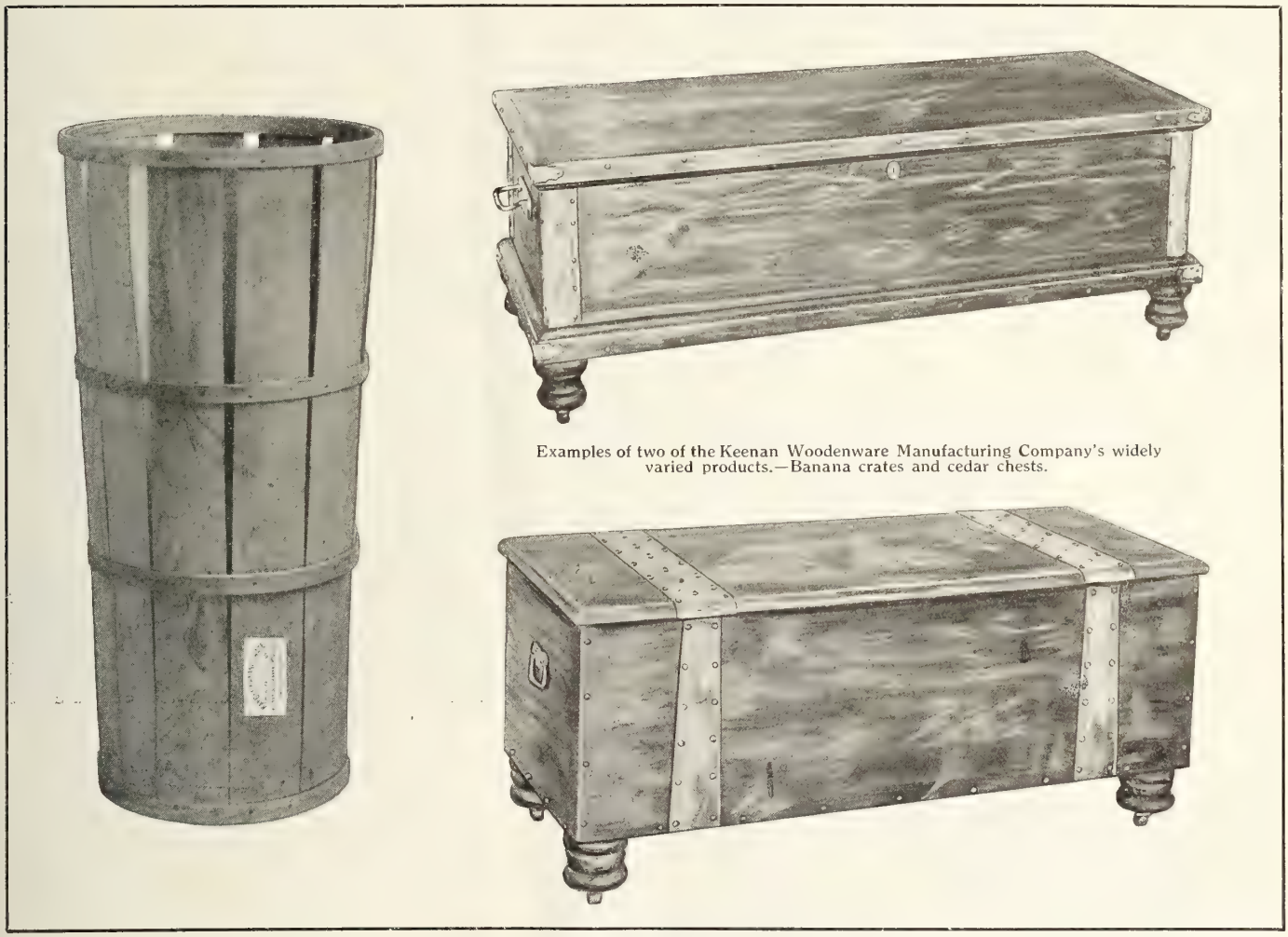
of automatic sprinklers comprise the fire protection.

The entire first floor is devoted to machine rooms, excepting where the banana crates are put together. For the manufacture of pails, the pine and basswood logs hauled up out of the water are cut into short lengths for staves and bottoms. These short lengths come up an incline to a set of six Whitney tub and pail stave saws on the second floor. Different sizes of saws are used, according to the size of the finished article. The logs are supplied in even lengths, so as to give a flat surface for the carriage of the barrel saw. The staves are cut and thrown into a truck and pushed into the dry kiln. The bottoms are sliced on an ordinary circular saw and dried.

After drying, the staves go to combination machines, of which there are four in this plant—of the type made by the Goodspeed Machine Company, of Winchendon, Mass.—where the pail is completed. The operation of one of these machines calls for five men. One man with a small circular saw and a special shaped table and guide edges the bark off the staves and gives them their correct taper. On the frame of the machine alongside the rip saw are a pair of cross-cut saws, which are set at a fixed distance apart. By means of a swinging guide a boy squares the ends of the staves and finishes them to their exact length. If the staves are to be matched, this operation is done on a separate machine with tongue and groove cutters. The staves are then ready to be set up by a man, who secures them with an iron ring and puts the whole pail on to a lathe and fixes it with end clamps. A smoothing knife, with automatic feed, finishes the outside of the pail, and another knife is brought into use at the end of the operation to cut a groove for the wire hoops. The whole surface is smoothed with a sandpaper block, swung on a wooden handle. The finishing of the inside of the pail is done on another lathe attachment on the same machine, but instead of being fixed between end clamps the pail is wedged into an iron cup. Another knife travels along the inside and smooths it, and at the end of the stroke the groove is cut for the bottom. This finishes the sides of the pail.

The bottoms are sliced downstairs, and after drying they go to a small edger to have the bark trimmed off, and are matched on a No. 213 Berlin continuous feed glue jointer, and glued up into squares. A 26-in. double surfacer by Baxter D. Whitney finishes both sides of the bottom ready for the turner, which is placed in the lathe room near the pail lathes. The turning machine is also by Whitney. This machine clamps the bottoms between the revolving discs and trims them to a circle by a fixed knife. The wire hoops for the pails are welded electrically. The pails, assembled with bottoms and hoops, are then ready for the finishing room, where they are painted or grained, according to their future use. A Whitney hoop press and hoop drivers are in use.

A small department downstairs makes wooden handles for the pails and baskets. The equipment of this room consists of a Rowley & Hermance planer, Ballantine power-feed rip saw, Clark Demill cut-off saw, and Goodspeed bail handle boring and turning machines. The hardwood boards are dressed to a



Examples of two of the Keenan Woodenware Manufacturing Company's widely varied products.—Banana crates and cedar chests.

thickness in the planer and ripped up into square strips. All the strips are cut up into short blocks, and then boiled in barrels of water to soften them, preparatory to the operation of boring and turning. Both these machines are hopper-fed and automatic in their operation. A cam action moves the boring bits into both ends of the handle blocks, and in order that the hole may be bored right through without the points

The tooth-pick machine.

of the bits meeting, the stroke of one bit is a little ahead of the other, so that one bit has started to withdraw before the other has reached the full extent of its stroke. Another cam action kicks out each block as soon as it is bored. The turning lathe works on practically the same lines. As a piece falls into the machine the centres move up and clamp the block, and the knife is brought to work. When completed a lever knocks the piece out from the centres. The wire bails are bent on small machines of the Whitney type.

A small department adjacent to the bail handle shop is given over to the manufacture of toothpicks and skewers. The toothpick machine in this plant is the only one in Canada, and was built in the shop by The Keenan Company themselves, as were also the skewer machines. One machine carries out the whole operation of making toothpicks from strips of veneer;

In the basket room.

while two machines are required for the production of skewers—one to make the dowel rods, and the other to cut off and point them. The toothpicks are delivered into small tin containers, which can be taken up and emptied into cardboard packing cases. Some idea of the quantity of toothpicks turned out by this machine can be gathered from the fact that it takes three girls to pack the toothpicks as they come from the machine. Its output is about five thousand a minute, and naturally it is not run for many days in a month.

Hardwood logs for veneer are cut off in longer lengths than the pine and basswood logs, and are dumped into vats for steaming. The bark is peeled, and the short log comes to a rotary veneer cutting machine, and scoring knives trim the sheet of veneer as it is peeled from the log, so that several strips of veneer cut to the desired width are produced at once. The equipment in the veneer room is by the Merritt Manufacturing Company, Lockport, N. Y., and consists of two rotary peelers and two clippers. In almost every case the baskets are made up on wooden forms, whether woven as in the case of meat baskets, or with solid bottoms as in fruit boxes.

One of The Keenan Company's latest products in the fruit package department is a special crate for shipping bananas. The size of this crate varies from twenty-six to forty inches in height, with a bottom from twelve inches to fourteen inches in diameter. The ordinary type has ten 3-in. vertical slats, a solid bottom, and three outside hoops—top, middle, and bottom. The design is varied to suit different requirements, and in some cases paper lining and top cover-

Another corner in the basket room—cedar chests in the making.

ing is provided, and in others 4-in. slats are used instead of 3-in. The design is patented in Canada.

Fruit and meat baskets and berry boxes are made up on the second floor, and most of the small work is done by girls. Cedar chests are one of the specialties of The Keenan Company; they are made of red cedar, and are used for storing fine furs. This red cedar is particularly knotty, but in the knots lies the resin which gives rise to the peculiar distinctive odour of this wood, which is abhorrent to moths, while pleasant enough to human beings. This red cedar should not be confused with the red cedar of the Pacific Coast. The red cedar from which shingles are made has a somewhat pleasant odour, but it is a soft wood, whereas the Tennessee red cedar is a close-grained wood.

The Keenan Woodenware Manufacturing Company is one of the few firms in Canada at the present day who can point to a full-time record for the last three years. They employ about two hundred people, and the business is constantly growing. While 1913 and 1914 showed an increase of about thirty-five per cent. over preceding years, 1915 has so far been quite as good as 1914.

Hepplewhite the Artist, and His Style

In this issue, by the kind co-operation of The Craftsman, of New York City, we are enabled to present an article on Hepplewhite furniture, written by Mr. James Thomson. The article is one of a series of four which will appear in The Canadian Woodworker. The first, which was published in our February issue, was devoted to the Chippendale style. The articles which will follow in early issues will treat of the Adam and Sheraton styles. The complete series cannot fail to have a well-defined educational value for the furniture manufacturer in this country, and we would suggest that the numbers in which the articles appear be filed carefully.—Editor.

HOW expressive of the habit of thought and social customs of the time in which it was built is an article of furniture such as a chair. This is true at all events as applied to the past, whatever be the facts as affecting the present. The English chair of the Cromwellian period carries betrayal of the austere folk who were wont to sit in it. The French chair of the time of Louis Quinze is expressive of a period when the pursuit of pleasure was of paramount interest.

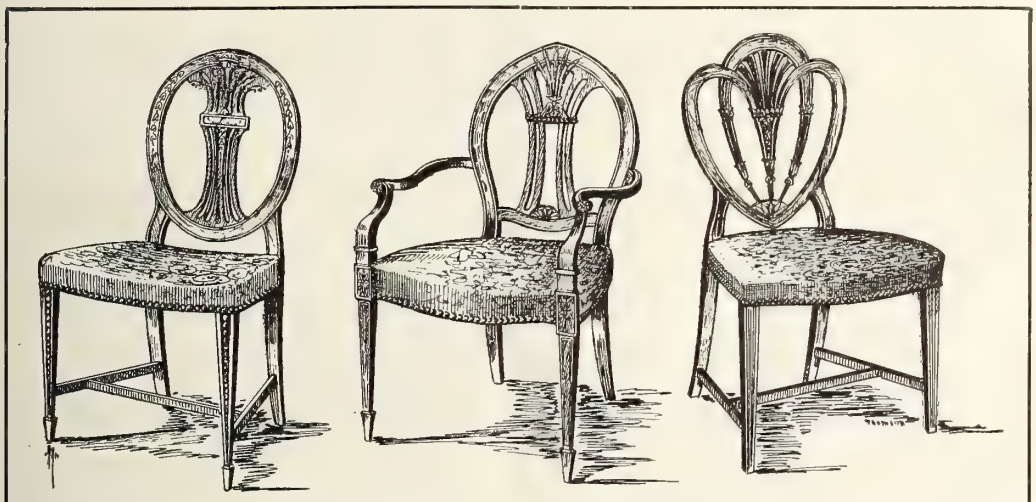


Fig. 1.—Three authentic Heppelwhite chairs.

Chippendale, nurtured in the school of Queen Anne, Christopher Wren and Grinling Gibbons, wrought into his product the thought of his time. His style was but an outgrowth of social conditions obtaining in the England of the early eighteenth century, of which the "Hogarthian plates" and the "Tom Jones" of Fielding are examplars. Men who were deep drinkers and hence tarried long at the wine, winning or losing money at cards until daydawn, needed just such capacious chairs as Chippendale designed for them. Being, moreover, men of education, it also was needful that the chairs should be pleasing to the eye, and Chippendale in vigorous manner met the need as no other cabinet-maker of his generation was able to do.

Hepplewhite may be said to have made his appeal at a fortunate time. He came on the scene in the presence of a desire for greater refinement, not alone in social relations, but in architecture and decoration. The semi-classical style that came into fashion in France with the advent of Marie Antoinette had its influence with English designing talent. The brothers Adam had completed some notable buildings in London, including the chaste and refined Adelphi Terrace and adjacent streets. The influence of the work of these Scotch architects was soon apparent even in America. Whenever the Adam residence was erected there was a demand for furnishings reasonably fit for it. While the Hepplewhite emanation was far from conforming with Greek and Roman architectural orders, it somehow did not seem out of place in the Adam interior. Here, indeed, was a cabinet-maker who pared away clumsiness to a remarkable degree; the style of Louis Fourteenth is considered light, but is really heavy in comparison. Hepplewhite's shaping of chair backs, his curving of arms and the like, assuredly pleased the eye. To work out such results with spokeshave, gouge, file and sandpaper required an eye sen-

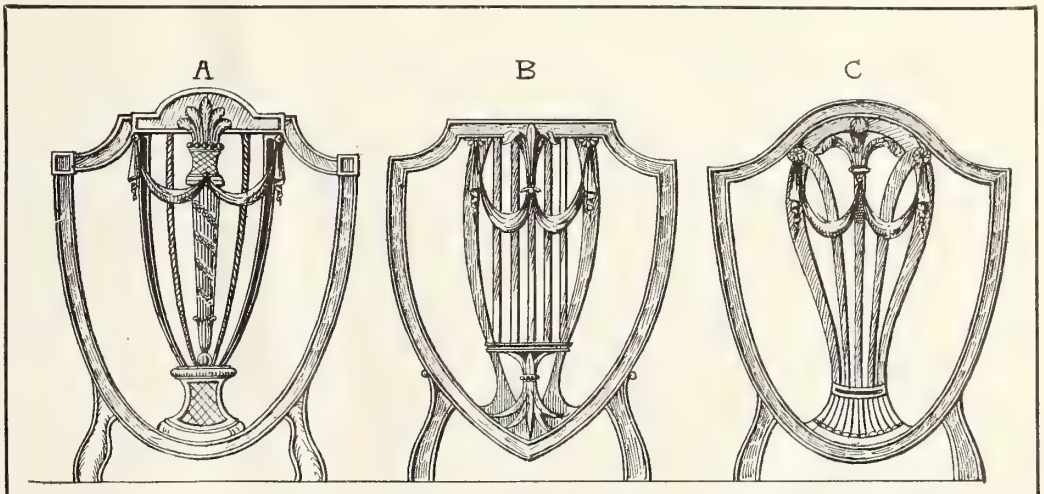


Fig. 2.—A is a Sheraton chair back; B and C are Hepplewhite.

sitive to beauty of line. The Cabinet-makers and Upholsterers' Guide, by A. Hepplewhite and Company, was published in 1789, just thirty-five years after the Chippendale "Director" appeared. Chippendale had died in 1779; hence it follows that for a quarter of a century he had had it pretty much his own way. While in favor he had rung the changes of novelty after his kind, but his day was done, in any event.

Hepplewhite designed all manner of furniture, but is chiefly remembered by his chairs and sideboards. In chair backs he affected the shield shape, but to this practice there were many exceptions, as reference to Fig. 7 makes plain. Here we have a chair that is sensible, beautiful, and, from the utilitarian point of view, excellent. The structural weakness to be found in so many chairs of this maker's design is absent in this case, the connection between the seat and middle of back having been provided for.

Claim has been made of all the old shield-backed chairs for Hepplewhite, but I am about to prove that the claim cannot stand. In Fig. 2 are shown three chair backs in which the shield motive is utilized. Now Hepplewhite was responsible for but two, B and C, while Sheraton designed the one marked A. So similar in character are they that one might well imagine them to be from a common source, a single hand.

In the presence of such similarity, how is the average man to differentiate? There is difficulty, it must be confessed, both here and in other directions. It is fair to say, however, that in but two instances in published designs did Sheraton employ the shield motive; his general constructional practice was to use straight lines.

The Hepplewhite chair arm, including the support, is always curvilinear, being similar to forms used in the style of Louis Quinze, but much more slender. The Dutch chairs that became fashionable in England on the advent of William and Mary had wonderfully flamboyant arms, and from these, perhaps, more than from the other did this designer derive his ideas. At any rate, he whittled away at a great rate, much to the satisfaction of the eye, though at a sacrifice of strength. But for the fact that the chairs were built of Spanish mahogany—a heavy, close-grained, tough material—they could not have stood ordinary usage. Made in the Mexican wood of to-day they could not at all have responded to practical purposes. Chairs made after designs here shown should be made of a tough material such as Cuban mahogany or cherry, which when appropriately stained makes an excellent imitation of the other more expensive wood.

The old-time chair-maker selected his wood with the same care as does the violin-maker. For the sweeps and curves, he chose such as had the grain following the direction of the pattern. His selection of material was always with an eye to the special purpose to which he intended it to be put.

Hepplewhite very seldom upholstered the chair back, and when he did so in the case of the arm the pad was so ridiculously small as to be remindful of a pin-cushion. In some such directions he could be at times extremely amateurish. In general he built in mahogany, varying on occasion with rosewood, both strong and close grained, admirably adapted to his design and mode of construction. Satinwood in veneer was employed for panelling, darker woods for crossbanding, while ebony and holly were reserved for division and boundary lines. Carving, inlay and painting were usual modes of embellishment. Angelica Kauffmann and Cipriana were artists called upon to lend their skill in decorating. The table shown in Fig. 6, as well as the chair back designated by the letter P in Fig. 11, are of the manner of patterns decoratively painted.

Fig. 3.—Hepplewhite armchair.

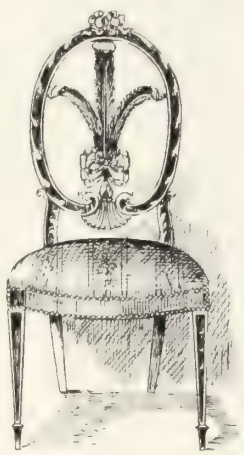


Fig. 4.—Prince of Wales' Feather design in Hepplewhite chair.

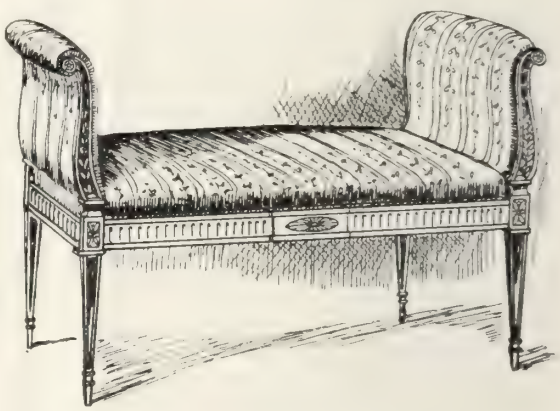


Fig. 5.—Hepplewhite settle.

In Fig. 1 are shown three standard patterns that have stood the test of time in their various modifications. Doubtless many of the designs published never got beyond the paper stage. Freak designs, if ever carried out in the wood, have all gone the way of such things long ago. The best alone have stood the test of time.

In Fig. 3, we have a chair in the best Hepplewhite manner. Here he joins seat and splat, which immensely strengthens where weakest. This pattern is most suitable for dining room or library.

To curry favor with the then so-called "first gentleman of Europe," but who, in truth, was far from being entitled to the distinction, Hepplewhite was wont to work into chair backs the Prince of Wales' feather. Here in Fig. 4 we have an example of such connection, though seldom did he make the feather so prominent.

A handsome and decidedly Parisian divan is delineated in Fig. 5. In an attempt to "gild the lily," the designer had introduced some soft textile caught up into festoons along and beneath the front rail. In the interest of simplicity I have omitted this feature, and consider that as it is here shown the article could

not be improved. Hepplewhite's casework was admirable; in Fig. 7 we have an example of it. The upper drawer I presume was intended for writing purposes, the front being let down, a slide drawing out, while the usual pigeon holes, small drawers and the like were thus exposed to view. Articles of similar design —though perhaps not quite so fanciful—are to be met with from time to time in the New England States. Made in mahogany, the customary and only attempt at embellishment is through the use of satinwood veneer—hair lines of ebony, thuya, and similar costly woods marking the divisions.

Fig. 8 shows a typical Hepplewhite sideboard, and here I may add that all sideboards of the concave-end variety to be found in the mother country are by this maker. In this feature they are apt to differ from the Sheraton examples, which have convex ends.

The sideboard of the Chippendale period, of which example is shown in Fig. 10, was in reality but a table. In fact, the piece of furniture was first called "sideboard table." Hepplewhite, in his first period, followed the practice of his predecessors. There were in his first sideboards therefore an absence of closets, these being made after the manner of that shown in Fig. 10, a good example of the designer's ornate mood.

The cupboarded sideboard, which found its fullest expression in Sheraton's pedestal-terminated designs, had, in a few years, by process of evolution, developed from the simple side table. To T. Shearer, contemporary with Hepplewhite, whose "Designs of Household Furniture" was published in 1781, the credit for the closeted sideboard must be accorded. In adopting the closet idea in this connection Hepplewhite and Sheraton simply borrowed a leaf from the Shearer book.

While Hepplewhite added closets to his sideboard, at first he used them only at the ends, to the centre space being allotted a drawer, beneath which was a clear space in which, resting upon the floor, awaiting the advent of the hot bird, stood the zinc-lined and ice-packed cellarette in which was the cold bottle.

The sideboard designs of Hepplewhite and Sheraton, to my mind, were very much improved by our Colonial craftsmen. English examples in comparison with ours look "squatty," being but three feet high, while ours are at least three feet four inches, and in one instance four feet from the floor. In other ways our Colonial examples show improvement over the Old Country model, diversity in the arrangement of drawers being one of them. Hepplewhite bureaus such as that pictured in Fig. 9 were made extensively in this country. Formed either with swell, serpentine, or straight fronts, they were common in old New England households. The feet are not always in the precise form shown here; in straight-fronted pieces the feet do not flare out at the toe.

Bureaus of this class—of which there are many to be found at present—were usually made in mahogany, the drawer fronts veneered with satinwood or, in lieu of that, some less expensive wood of native growth, maple, curly birch, or root of willow. The light wood had round it an inch-wide border of mahogany or other dark wood, a neat beading surrounding the whole. Narrow strips of ebony marked the division lines between the light and dark woods. A little home-

EXAMPLES OF THE HEPPLEWHITE STYLE

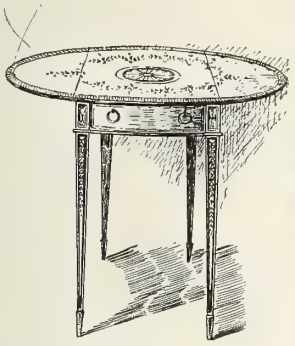


Fig. 6.—Slender Hepplewhite table.

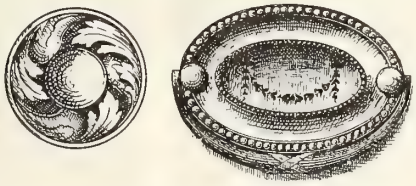


Fig. 6A.—Hepplewhite drawer pull head, and drawer handle.

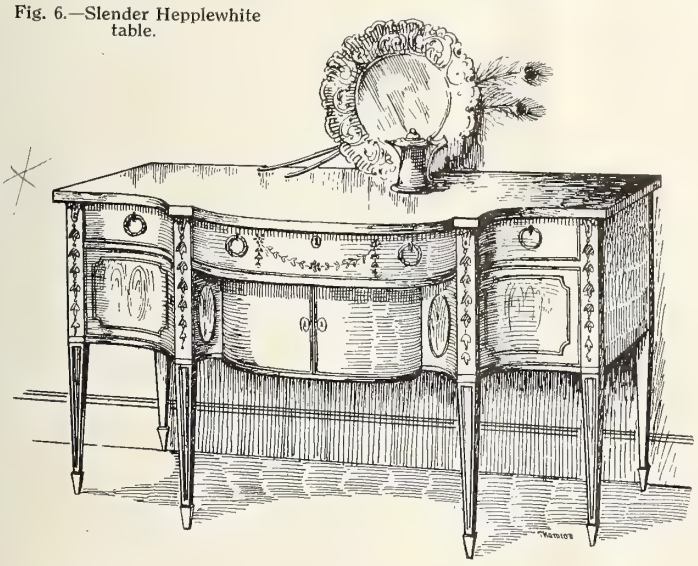


Fig. 8.—Hepplewhite sideboard.

Fig. 7.—Hepplewhite highboy and chair.

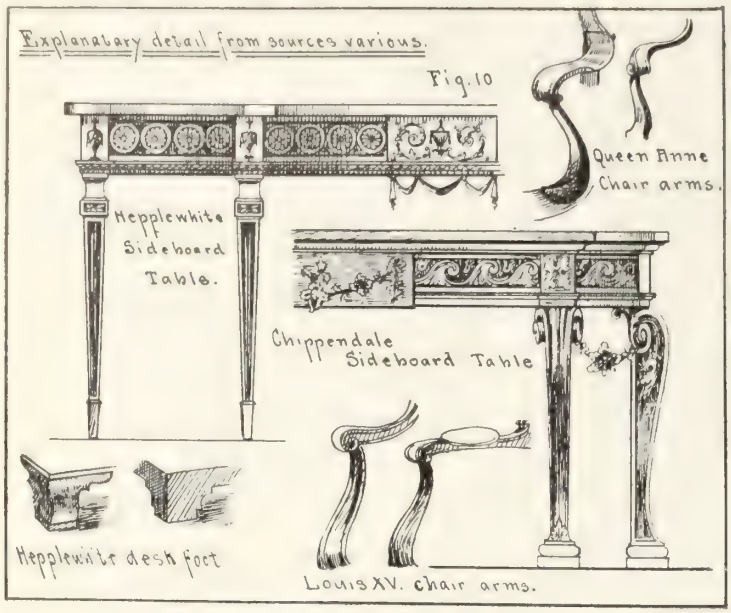


Fig. 10.—Explanatory detail.

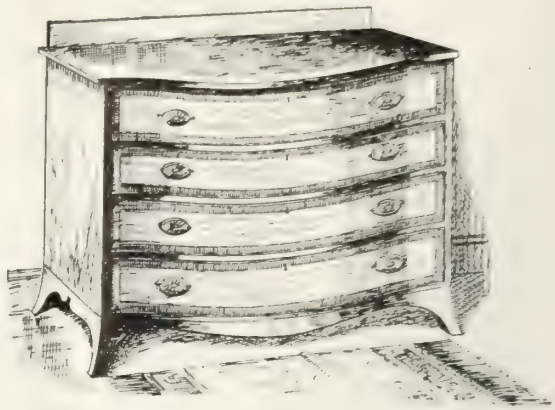


Fig. 9.—Bureau in simple Hepplewhite design.

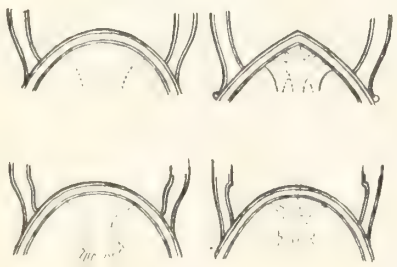


Fig. 12.—Above, the Sheraton manner of joining the shield to the back legs; below, the Hepplewhite method.

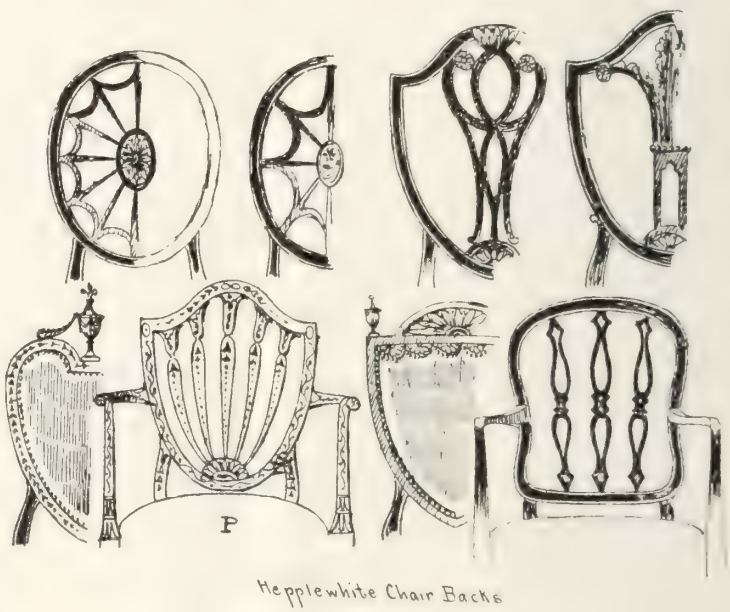


Fig. 11.—Exquisite studies of Hepplewhite designs.

made inlay sometimes ran around the edge of the top. The foregoing description is applicable to all Hepplewhite casework of Colonial inception.

We find instances where the likeness between the Hepplewhite and Sheraton product is so close as to be puzzling. Errors are undoubtedly made in distinguishing the one from the other. Both designers used inlay and painted decorations. In many instances the festoons, running ornaments, patera, and the like are identical, which may be readily understood when it is known that they both went to the same source for them. Sheraton affected the turned and reeded leg in a great many cases, but he also employed the square leg in the identical manner that Hepplewhite did. The arrangement in panelling by veneer of a lighter tone than the ground is the same with both. As regards the shield-backed chairs between which there is so much likeness, I would refer readers to Fig. 2, where certain differences in connecting the back legs with the seat are observable. Another subtle distinction may be referred to: where Sheraton affected the shield motive in his chairs—and there are but two known instances where he did—we shall find the top line not continuous, there being an interception in the flow of curve. Where Hepplewhite is concerned this is not the case.

There is also a difference in the drawer handles employed by each. In the accompanying designs are two handles typical of Hepplewhite practice. Of elliptical drop handles there are a great many patterns, all very chaste and beautiful both in conception and execution.

While Hepplewhite left his mark, he cannot, in my opinion (from the designing point of view) be classed with Chippendale. He belonged to the mechanical rather than to the free-hand order of designers. Chippendale could do with ease what his compeers failed to accomplish even with painstaking effort. There is

ease, vigor, largeness of conception, certainty of touch, and prolificness of idea as regards detail in the work of Chippendale which there is not in that of Hepplewhite. The chair backs of the latter furnish evidence in abundance of the use by the designer of the thin wooden curves, ellipses, parabolas, hyperbolas and the like, all conforming with certain geometrical formulae.

Laying Off for Ship Joinery

By K. McGilvray, Dundas, Ont.

UNTIL recent years ship joinery and ship cabinet-making did not enter into Canadian woodworking to any great extent, but latterly some large-sized passenger steamers have been built in Canada, and now we have shipyards building in two or three districts, which in a few years will employ a great many woodworkers. Under these circumstances, no doubt, many will be interested in this class of work.

For exposed woodwork, teak has been the general wood used (especially in British yards), but owing to ith scarcity and the distance to be shipped (mostly from Burmah and India), wood importers are looking all over the world for some wood to take its place. For interior work (painted), yellow pine, basswood, white pine, etc., are mostly used. Most of the furniture is usually polished and is made of teak, mahogany, cedar and satin walnut or red gumwood for staterooms and officers' quarters, but saloons, smoking rooms, music rooms, lounges, etc., are mostly treated more elaborately. These are mostly polished panelling for sides and ceilings. Often the framing is of one kind of hardwood and veneered panels of another, such as mahogany framing and birds'-eye maple veneer panelling. In this article I will treat mainly on what is known as joinery work.

In ship work you cannot as a rule use a plumb or level, as all the decks are built on the round, which makes both your floor and ceiling to a greater or less extent part of a circle. In laying off framing for a row of staterooms as in Fig. 1, care has to be taken in dividing off rooms to consider the iron beams of deck above (Fig. 2A). As cross bulkheads between rooms should be carried right up to under side of deck above also, care has to be taken to allow for size of beds and doorways. One way to make framing for a long section, fore and aft, as in Fig. 1B, is shown at elevation and sections (Fig. 2). In this case, the pieces of framing would all be made equal size in the shop, and its being about midships the round of deck, fore and aft, would be very little. The end frames, of course, would be a different size, and could be made later on, at fitting up time.

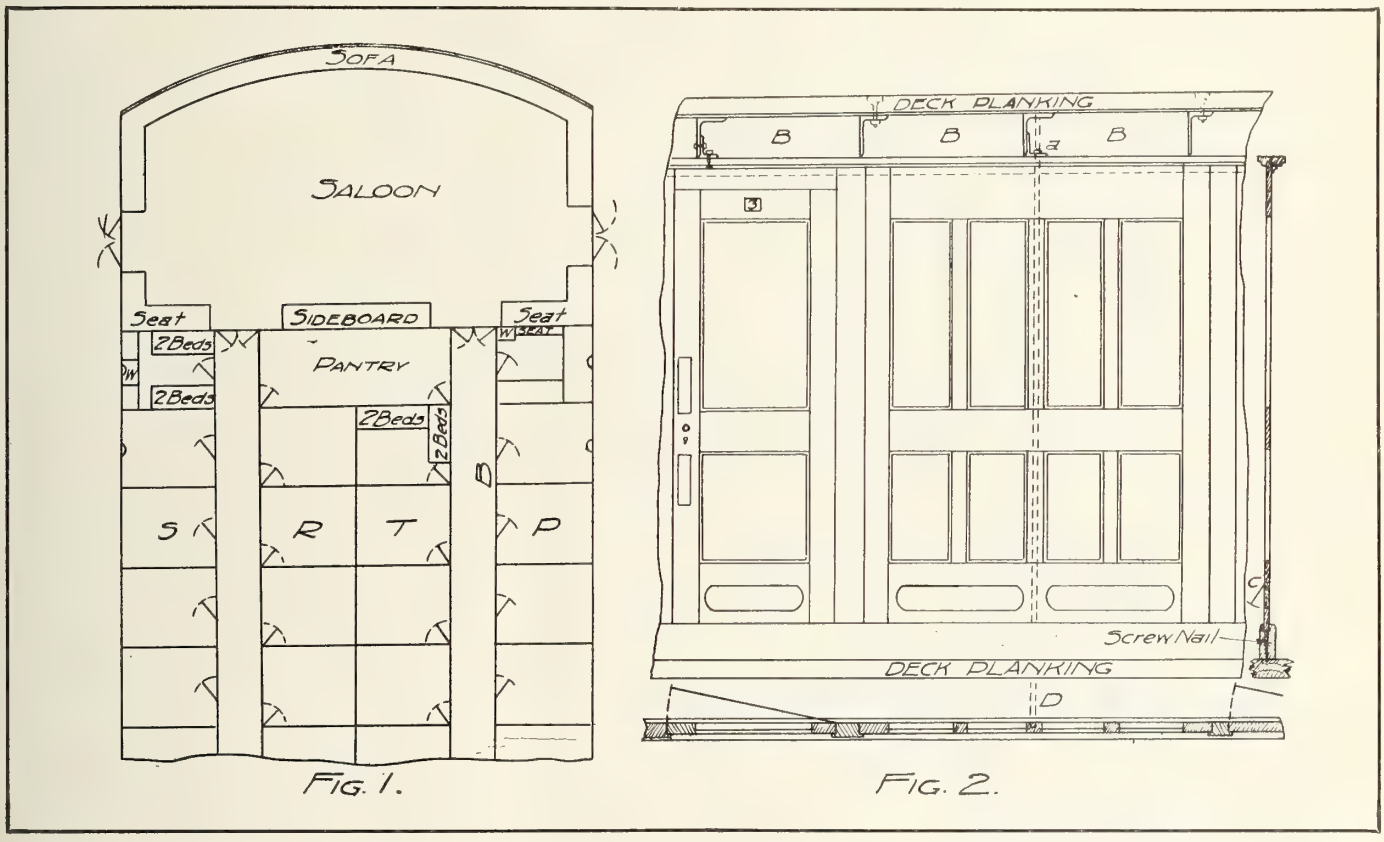


FIG. 1. FIG. 2.

All these frames are made about one inch longer and one inch wider than the finished sizes shown. This allows for any discrepancy in the iron work, also for getting the moulding running in a true line. A three-inch air space should be put in the bottom rail, filled in with an iron grating, wire mesh or wire netting, and a half-inch thick piece of wood hinged on inside of frame, as shown in Fig. 2 C. Sometimes this air space is put in bottom rail of door only, but it is shown here in both framing and door. The spaces above the ceiling cant, between the angle beams marked B (Fig. 2),

are also usually filled in with wire netting of a small mesh, which allows for ventilation, and at the same time keeps out insects. The section in Fig. 2, shows how ceiling cants and deck cants are usually fixed to the deckwork. The ceiling cants are usually 2 in. x 6 in. pine, machined to section shown with groove for framing to fit into it, and then shipped on top of deck cant to its place and nailed (Fig. 3). These frames should not be fitted in too tight as they are likely to swell a little when painted.

The deck cants are usually of pitch or Oregon pine or other wood that stands water and rough usage. The sizes vary from 4 in. x 3 in. to 8 in. x 4 in., and are screwed down to deck if it is wood, or bolted down if it is iron (Fig. 3D). End sections of door posts, intermediate posts and corner posts are shown at Fig. 3, A, B, C. The intermediate posts are used where two bulkheads or two pieces of framing join together at right angles, but sometimes they are done away with, and a groove or rebate is cut in the framing half-inch deep, to take cross bulkheads, as shown by dotted lines at D (Fig. 2). The cross bulkheads are sometimes frame and panel, and frequently

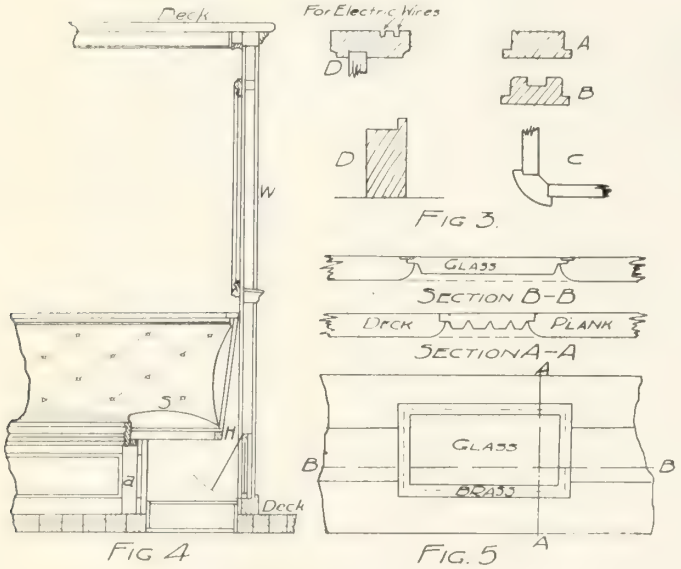


FIG 3. FIG 4 FIG. 5

matched boarding 1⅛ in. thick, cleaned both sides with V joints.

In Fig. 1 it will be noticed there are four rooms to the width. Those marked S and P are what is known as outside rooms, as they have windows or port holes to the outside, but rooms H and T are inside rooms, and light and ventilation are supplied from the deck above. If a deck house is on deck above, such for instance as a smoking room, music room, etc., a system of borrowed lights is used, as shown in Fig. 4. These lights are usually about 12 in. x 24 in., and hinged to open inwards from room below, as shown at H. They are under the sofa or settee, which as a rule goes right round public rooms on a steamer, as shown in section at S. In this case the sofa front would be panelled or of matchboarding, and would give a clear space of about 18 in. x 18 in. by full length of deckhouse, for light and ventilation to rooms underneath. Another method of a clear deck space if desired on upper deck, is the use of 12 in. x 6 in. prism glass lights, as shown in Fig. 5.

In ship joinery all joints in exposed woodwork should be well painted with thick paint when putting together, as few nails as possible used, and those used to be of brass, composition or galvanized, as a protection from the effects of water.

The Hardwood Market

AN interval of one month is too short a period to show much change in market prices as business conditions are at present. Since the end of the winter prices have remained almost unchanged except in the case of some of the heavier lumber that is in demand for military supplies. Two-inch birch lumber is a good example of what has been affected so far. Otherwise prices have remained fairly steady. Prices are not falling off in the hardwood business, because, although the demand is lower than it was last year, the mills are not taking any chances on overstocking, but are keeping down their production of lumber as far as possible. Of course, this is likely to mean a considerable jump in prices in time. If ever the demand should increase from any cause the prices will climb, because the mills have no lumber on hand with which to supply any requirements in excess of their present production, and it will mean that before more lumber can be placed in the yards to meet any considerable increase in demand a great number of mills will have to be started up. Prices are low now—in fact, so low that many mills cannot sell lumber at prices that will pay their expenses. Consequently a number of them will not commence to produce lumber before they are sure of obtaining an advance on present prices. No one can doubt that the next movement will be an upward one. The information lacking at present is the approximate date of this upward movement.

The export side of the business promises favorable developments in the future. The condition of foreign markets indicates that there is likely to be a demand for supplies from this side. Shipping is greatly restricted, and, although there is no urgent demand at present, the smallness of the exports means that the demand will be the more urgent when it comes.

The building trade demand for hardwoods continues light.

The Cooperage Situation

By James Innes

BUSINESS is picking up to some extent, but is still very slow for this season of the year. Prices, especially on gum staves and hardwood heading, are very low. In fact, the mills cannot make any money at present prices, and are only selling what stock they have to move in order to make room for storage. Elm staves have also been very low, but are stiffening up a little, as there are very few left in the country, and at the going price of elm logs it is impossible to make staves and sell at prices to compete with gum staves, which, while not as desirable as elm, can be used for a great many purposes for which elm was formerly employed.

With hoops there is very little change. The trouble is that the supply of stock at the present time is very much larger than the demand, and until this is overcome there will be very little change in price.

The reports on the apple crop so far are that it has not been hurt by the frost, and if nothing happens dur-

ing the next few weeks there will be a fair crop of apples—not as large as last year, but still a good crop. The crops generally throughout the country were never in better condition. The wheat crop will be the largest ever known if nothing occurs to damage it. With the good start it has now it is unlikely that it will be affected by insects.

Export trade is opening up, and while freights are still almost prohibitive, the stocks on hand in foreign countries are so low that buyers are having to take in stock even at the highest of freight rates. New business, for this country, is opening up all the time on account of the Austrian and German stock being shut out of the world's market. This will help a lot if the available tonnage can be secured to transport the stock to the different countries. While there is a very optimistic feeling throughout the country, and trade on the whole is reported as getting better all the time, the cooperage industry has not felt the change in the market to any extent as yet.

QUESTION BOX

A Practical Department of Reference for the Practical Man

A Foaming Glue Spreader

Why does a glue spreader sometimes cause foaming, when the same glue can be spread by means of a brush without any of this trouble? We find that our spreader sometimes behaves in this way and we are at a loss to account for it or to find a means of remedying the difficulty. Perhaps some reader of the Canadian Woodworker may be able to assist us to correct this fault.—**L. J. C.**

Belting a Resaw

We are going to install a band resaw, and the most favorable location we can find for it in our plant, in order to handle the work economically, is about forty feet from the nearest line shaft—heavy enough to drive the machine. Would it be possible to belt the resaw direct from this shaft without putting in a countershaft? What arrangement of idlers would be necessary, and how should provision be made for the stopping and starting of the machine?—**"Planing Mill."**

Conversion of Wood Waste

Q.—"It has been suggested that the production of alcohol from sawdust offers a means for the profitable conversion of this form of wood waste; we have been looking the matter up, but fail to find any authentic information concerning a satisfactory process. Of course, we know that alcohol can be extracted from sawdust, but is there a really satisfactory process known at the present time, and if so, can you give us some information concerning it?"

A.—It has for some time been possible to convert the cellulose of sawdust into glucose and eventually into alcohol by means of heated sulphuric acid, but this process was never a commercial success on account of the extreme difficulty of removing the acid from the resulting solution. This difficulty has been overcome by using gaseous sulphuric acid instead of the liquid, and as this escapes on the application of a gentle heat and leaves nothing to prevent the free fermentation of the sugar the process presents no insurmountable difficulties, and may be made profitable provided the supply of sawdust is ample and the market for the alcohol is at hand. The following is a brief description of the outfit and process, as much as it is possible to give here.

The outfit includes an acid apparatus for mixing the acid and water, a revolving digester similar to those used in the making of chemical pulp, a number of exhausting tanks through which water may be passed, in which the sugar produced in the digester may be washed out, neutralizing vats in which the various acids produced by the process are neutralized by carbonate of lime, and fermentation tanks and stills, where the process is completed as in an ordinary distillery. The digester is first nearly filled with sawdust and to it is added about one-third of its weight of the acid solution. Steam is turned in and the digester revolves slowly, heating the contents to about 295 degrees Fahrenheit. The sulphurous acid gas is driven out of the water by the heat and attacks the wood directly, converting the cellulose into sugar, the pressure in the digester in the meantime increasing to around 100 lbs. on account of the liberation of the gas. This treatment requires about three hours, and the amount of sawdust treated is about 400 lbs. The steam and acid are then blown off into tanks for the recovery of the acid, and the cover of the digester is removed. The contents, which are black or dark brown, and look like ground coffee as much as anything, contain the wood fibres and the converted cellulose or sugar and various other products resulting from the action of the acid and the heat on the wood. The process must not be carried far enough to destroy the sugar by reversion.

The exhausting tanks are about ten in number, each one being large enough to contain the charge of the digester, and connected by piping so that the contents of any one tank can be emptied into any other, or fresh water introduced into any one of them. In practice, the charge from the digester is placed in one of the tanks, the others being assumed to contain partially washed charges, and the solutions containing various quantities of sugar are washed through it in succession, beginning with a strong solution and ending with pure water. The process is continuous and when a tank full of sawdust has received ten washings it is emptied out and refilled with a fresh charge. The result of this process is a solution containing about 450 lbs. of sugar from a long ton of sawdust. About eighty per cent. of the sugar is capable of fermentation. It is pumped to the neutralizing tank and treated with carbonate of lime to kill any acids that may remain and which might interfere with the process of fermentation. It then goes to the fermentation vat, where the yeast is added, and it is kept at the proper temperature until the fermentation is completed. The product now passes to the still room, where alcohol is distilled in the usual way.

Staining and Filling in Their Relation to the Finish

By W. J. Beattie

A WORD or two on the importance of staining and filling may be in order, especially in regard to open-grained woods, of which oak is the most used. There is nothing entering into the work of finishing that is more neglected than staining and filling, although this is the foundation of the work, and unless it is done properly results cannot be anything but disappointing. Two different strengths of stain should be used—the weaker for all end parts and places that absorb the liquid readily, and the stronger for the rest of the work. It should be brushed well into the grain, and allowed to dry before the application of the filler.

A filler bought ready mixed is to be preferred to one made as it is required in the factory, as in the former the proportions of the different materials are exact and are ground together by machinery, and the necessary thinning is all that has to be done. It is important that the vessel containing the filler ready for use be not too large, in order that the mixture may be kept stirred; otherwise the heavy ingredients soon sink, with the result that there is only a small proportion of the filling material in the mixture, and the grain of the wood remains porous and absorbs the shellac and varnish to such an extent that at least an extra coat of the latter will be necessary to make even an ordinary job. Filler should be used in full strength, and allowed to set sufficiently to rub stiffly. It should be rubbed across the grain at first so as to force it into the wood effectually. Use a rather coarse moss, and then wipe lengthwise with cotton wipers.

Drawer sides and interior work, which are to be kept white for varnishing, should be free of dirty smears and finger-marks. How many times these unsightly smears are seen on the edges of drawer sides in articles otherwise presentable! Many factories consider that staining and filling is a job that can be done by any one; consequently they get any kind of help, and then they wonder why it takes more varnish to make a good job of the work.

Preparation of Shellac

Unless the grain is well filled and the filler well dried before the shellac and varnish are put on, results with be only mediocre. If the finishing coats are put on before the filling is properly dried, in a few weeks the varnish will sink in with the shrinkage of the filler and will be condemned as worthless. After being filled, all work should be left at least twenty-four hours to dry before the shellac is applied. Have the filling done well by dependable help, even if the time it takes seems too long: it is labor well spent, and the saving comes later.

Shellacing does not require as much care as filling, but it should be done evenly. As the shellac dries rapidly, it must be used thin. Many manufacturers buy the shellac gum and cut it themselves, rather than buy it ready mixed. If the mixing is to be done in the factory, it is better to dissolve the whole sack of gum at one time, as it will deteriorate if left lying about. Procure a good oak barrel having only one head in—to stand on end—and, to prevent evaporation, make a removable lid for the top that will fit snugly over the end. Through this lid, and partly into the bottom, bore a ⅝-in. or ¾-in. hole to take an upright shaft. This shaft is furnished with four wings, and the top end, which projects through the lid a few inches, is fitted with a crank handle. The gum shellac and spirits in the proper proportion are placed in the barrel, and are agitated occasionally by turning the crank, until the shellac is dissolved properly. The barrel is fitted with a wide-mouthed molasses gate, so that the shellac can be drawn off quickly as it is required. The barrel is elevated sufficiently for the shellac pots to stand under the outlet. Such an arrangement, by preventing evaporation, will effect a great saving of spirits, and in this way will soon pay for itself. The agitator referred to could be made of good hard maple or birch, in place of metal, which would have to be tinned.

Varnishing, being the next step, and a very important one, is worthy of some remarks. A varnish room is very seldom all that it should be. Many varnishers think that a room that is hermetically sealed is the proper thing, and they will work month after month in a vitiated atmosphere, to the great detriment of their health. As a rule, in a few years, if he does not die on the job, the varnisher has to leave his work to seek other employment. However, the old theories about the drying of varnish are being exploded, as are the old ideas in regard to drying lumber. The result will be most beneficial to the health of the men, which is gradually coming to be considered of some importance. The proper drying of varnish requires air circulation—not stagnation—as has been proved time and time again. Therefore arrange for a good circulation of fresh air in the varnish room.

Varnish Drying

While on this subject it might be well to draw attention to the varnish drying kilns which have been introduced during the last few years. They are a great help to rapid and even drying, and enable the manufacturer to fill orders from white stock much more promptly. As most patterns manufactured at present may be called for in different finishes, it is best to keep all the stock in the white and do the finishing as orders require it.

In orders for goods in golden oak, or in any finish in which varnish is used, the varnish dry kiln will be found a great help in gaining time. Goods in golden oak can be finished in a week easily, while the usual time required is about three times as long. This is surely a consideration. These varnish drying rooms are constructed so that the air is in constant circulation at a temperature of 104 degrees. It is well to have fresh air from the outside piped into the room—

through fine screens, if necessary—as this will accomplish the drying of the varnish much more quickly than would be the case if the same air were used over and over again. The temperature of the room is automatically controlled, and cannot go above a certain degree.

As the goods are varnished they are piled on movable trucks and run into the drying room, and in this manner the handling is easily done. It is well, also, to have an opening from the filling room into the drying chamber, where filled goods can be left for three or four hours, after which they are ready for shellacing, when brought out and allowed to cool before the shellac is put on.

The International Varnish Company, of Toronto, make a first-class varnish dry kiln, and no doubt will be glad to furnish full particulars about their kiln to any one interested.

The general rules for varnishing are: Have proper varnish for the work, have clean brushes and pots, and use exactly the same varnish for each coat. Never expect to get good results from using different grades of varnish on the same job, and as a rule do not thin varnish, but, as nearly as can be calculated, put the amount required into the pots as needed. Varnish comes ready to use, and should be of the right "weight" as it comes from the barrel. It is wrong to dilute varnish with turpentine and then blame the varnish manufacture for the poor appearance of your goods.

Standardizing Results Secured by the Use of Formulea in the Finishing Room

By Walter K. Schmidt

THERE is no other wood that gives us greater latitude, and therefore greater possibilities in color effects than oak. Outside of the staple finishes, such as Golden, Early English, and Fumed, there are dozens of conceptions of color schemes that cause the finishing department more or less worry. When you stop to analyze these different productions it will be found that there is a similarity, and if the basic principle of these different shades could be understood, it would be rather an easy matter to meet the requirements, and to produce matchings. English fumed, or, as some call it, No. 4, Oriental Oak, Butler Oak, are examples of the later day productions on oak. There is a similarity running through these, and by modifications of the chemicals employed, the various tones are obtained.

General directions have been given which virtually governed the production of all the oaks. Undoubtedly many a man has read these instructions, and some have tried them out. But, with all that has been said, the end has not been attained. That is to say, the information has been given in a comprehensive way, so that it should be retained when examples present themselves. We have just lost another year, and presumably none turned over a new leaf. Everybody connected with the Finishing Department realizes that there is a large demand upon the foreman finisher and it is an ever increasing demand. This is for a diversified knowledge and versatility in the matter of the production of colors to meet the unusual. Therefore, I take it upon myself to venture the suggestion that inasmuch as all the formulae that are given are practical ones, those produced after careful experiments, and are usually formulae which are in daily use, the only requirement is to modify them as the immediate case may require. Therefore, I say, let him whose daily occupation consists of conducting a finishing department, doing finishing, or who is otherwise interested, verify these formulae. Do this with the idea of becoming familiar with the effects on wood as the formula is given. The result will be a comprehensive familiarity with the colors and chemicals employed. You will know just how they act. That man who is in charge of a department in a factory, or any kind of a finishing department, where one or two shades are run, may be a successful foreman. He may know how to handle his men, save time, save labor, and turn out elegant results, but if he be one of those who is satisfied with this, he soon finds himself in a rut, and when a special does come in, he is up in the air. Undoubtedly, he will remember reading something about a particular finish; he may have seen it in the show windows of the large stores, but it was only of passing interest to him, because his factory wasn't making that sort of stuff; and now he begins to scramble. An unexpected order has come into the factory, and with it a sample that is to be matched. Had he availed himself and acquired a knowledge of the methods that have been published, he would at once have in his mind some idea of what would be required to produce this color. The following little story, which is only given as an exemplification of an idea, but which is an actual fact, and which I am happy to say produced $25 a month increase in salary, will illustrate.

"I have in our shop a uniform size panel, and in some cases five or six which show the result obtained from every formula, method or scheme for making stains. In the back of each panel, I have the colors I employed, the different quantities—in short, all the detailed information required to reproduce that board. I am proud of my collection, because the information I gained in making these panels has helped us so much in meeting the demands of our customers in producing exact matchings, and the fact that I am no longer timid about tackling any kind of a finish that the salesman may send in. I wouldn't take a good many dollars for these boards. They are better than a receipt book, for in a measure they tell their own story."

It is gratifying to see that at least in this case benefit was derived by the application of the published matter pertaining to the finishing department, but here is a sad case.

Did Not Allow Time

A factory took on a contract and had a good sized sample panel finished, showing the finish that the job was to have. There has been a good deal said about stains requiring from twenty-four to forty-eight hours to attain their final color. In this case to which we refer, this fact was probably not recognized, or not taken into consideration. At any rate, the foreman prepared the stain, and gave it to the men. The job

was finished. During the finishing period, however, he noticed his job was darker than the panel, so he quietly darkened the panel to match his job. Unfortunately, the firm that ordered the goods had retained half of the panel, and the desire of this unfortunate foreman to have his work meet with approval led him to doctor the sample in the hope that he could get by with the job. He did for a time. The office passed up the job and shipped it out, but the factory got it back. The entire outcome of the unfortunate circumstance is not known to me, except this one fact, the foreman is no longer employed at that factory.

Two mistakes are exemplified in this story. One is the doctoring of the sample, and the other is not knowing how to correct the error in the work. The reduction of a color is not impossible, and there are certainly plenty of sources from which the information could have been obtained, rather than to precipitate such a loss upon the employer.

In the oak finishes mentioned in the beginning of the article, the following principles should always be considered in the production of these colors. There is a certain amount of black required to produce these oaks. Whether they be overshadowed by the other colors present or not, that peculiar tone is dependent largely upon black. Now, then, it is up to the operator to decide how he will make use of the color. It is known that iron in its various forms produces a gray to a black, according to the amount of tannin present, and if not sufficient tannin is present, it can easily be added in the sponge coat. That is one way of obtaining the black. The second is by the addition of nigrosine to the stain coats, or a final coat of thin nigrosine solution. The peculiar trick manifested in these colors, or finishes, as they are generally called, is the fact that a small amount of fuming, or the same color effect produced by stains or chemicals, which are all on the brownish color, are so treated that they give the grayish tone which gives them the name English Fumed, Oriental, etc. By the chemical effect of producing the Fumed, we refer to the shades produced by the alkalies in conjunction with the chromates, which again are subject to increase in intensity and modifications by the quantity of tannin or tannic acid employed. The great amount of variance possible by increasing or decreasing the strength of the various groups employed is that which gives us such an unlimited amount of color results. One man may be working on a definite quantity of the tannin, and changing the strength of his alkali group. He will get the same results as the man who is holding his alkalies to a definite strength, but changing the tannin group. The addition of nigrosine to the alkaline group will not answer in the production of any of these colors. It must be superficial. That is, it must be applied after all the other coats have been found correct.

Now, to resume, the following procedure will exemplify the operation: Coat with a solution of iron, or coat with a solution of tannin, and then iron. The various strengths will produce the various shades. Then over these coats apply the alkaline solution, made out of carbonate of potash, bichromate of potash. Some prefer to add a little ammonia water. In this manner are obtained the various inceptions of colors as given in the beginning of this article. A final touching of nigrosine produces that cold gray tone, which should not be called or understood to be gray, but it is the cast of the general appearance that only can be produced by the presence of black in the general finish. —The Furniture Manufacturer and Artisan.

The First Aid Column

A department within a department to which Foreman Finishers and others are invited to turn for a solution of the practical problems encountered in their work. Readers are particularly requested to give the trade the benefit of their experience from time to time by replying to the questions asked. A number of new queries are to hand this month. They are given below. Be a live wire. Let us hear from you.

A Problem of Poor Finish

Is it possible to produce a Belgian grey finish on oak porch furniture without the objectionable white cast in the pores of the wood? I am constantly trying to overcome the difficulty, although a lot of this sort of furniture is sold with the pores showing white. Can any other finisher advise me of a way out of the trouble?—**B. G. Martin, Ottawa.**

Red Cedar

I have obtained a quantity of red cedar lumber, and I think of making one or two small boxes or chests from it. How can these boxes be finished so that they will not look glaringly "new?"—**L. V. Janin, Quebec, Que.**

Filling Weather Checks

(Question asked in the April issue of The Canadian Woodworker.)

Is there any method of preparing lumber that has been checked by exposure to the weather, so that a good finish can be applied? The ordinary paste filler seems to sink in, and we should be glad to know if there is any other material we could use to fill these cracks properly.—**Bryan Top Company.**

Answer by R. Ferguson, Toronto

The cheapest way to overcome the checked lumber trouble is to use a cement made of sawdust from the wood to be filled. The sawdust must be fine and clean. Place the sawdust in an earthen pan and pour boiling water over it. Stir well and allow to stand about ten days, stirring occasionally during the period. Boil the sawdust again at the end of the time until it has the consistency of a paste. Squeeze out the moisture through a coarse cloth and keep for use as required. When there are any cracks to be filled take a sufficient quantity of the sawdust, mix to a paste with thin glue and apply to the cracks. If the paste is allowed to dry thoroughly before the surface is cleaned off, the cracks will be undiscernible after finishing.

* * *

Answer by T. S. Jefferson, Hamilton

In the first place, is the Bryan Top Company sure that the checks are altogether due to exposure? Minute cracks may be caused by some irregularity in the kiln drying, and it would be well to look into this end of the business. In any case, it is not much use to try and obtain a good finish on checked wood. It is impracticable to fill the cracks on account of the time required, and even if the cracks are filled level the color of the filler is apt to show through the finish. Prevention, in this case, would be much cheaper than an attempt to cure. Look after the lumber before it goes to the finishing room, which should not be allowed to degenerate into a kind of hospital for repairing defects caused by improper handling of the lumber in previous operations.

Answer by The Dougall Varnish Company, Limited

We have heard of this problem being handled fairly well by mixing finely ground sawdust with liquid filler. The best method, however, is to stain or color the work and then fill all the holes with an oil putty, stained to match the color on which it is applied. This method is to be recommended only where the finished work does not receive any great vibration. In the latter case, the only thing to do is to bore a hole a little beyond the end of the crack, which will check its progress should it eventually reach this point. Then gouge down for about a quarter of an inch all along the path of the crack. A piece of new stock is glued in this opening and the finish is brought up in the usual way.

Wanted—A Stain for Fir

(Question asked in the April issue of The Canadian Woodworker.)

Can I secure a description of a good stain for fir through the medium of the First Aid Column? The work I have to finish is the interior trim of a house and also some of the inside doors. I wish to get really good results, and shall hope to receive useful information from other readers of The Canadian Woodworker.—**"Mill Finisher."**

Answer by The Dougall Varnish Company, Limited

Fir is one of the most adaptable woods for staining, in that most water or acid stains can be used successfully on it, in addition to all oil stains. The acid stains are the best. They require extra labor in sanding down after application, but the final result is rich and permanent. The leading wood finishing manufacturers make a large and varied line of both types of stain.

* * *

Answer by R. Ferguson, Toronto

For staining pine and cypress I use a mixture of Japanese stove enamel and coal oil. This makes a very reliable stain which would look well on fir. The use of the coal oil has the advantage of keeping the air from penetrating the wood, thus avoiding the shrinkage that is common in interior finish. If the stain is allowed to dry thoroughly before the application of the finish, I think it should suit the job admirably. The shade should be tried out on a piece of the wood to be finished before going ahead with the whole of the work.

Testing Varnishes

(Question asked in the April issue of The Canadian Woodworker.)

Can any readers tell us by what means it is possible to determine the durability and general usefulness of different kinds of varnishes? We have not been getting the results we have aimed at, and we should appreciate any information which would enable us to form a dependable opinion of a varnish before using it.—**Evans & Company.**

Answer by Foreman Coach Painter

The test of actual use is the best for all varnishes, but it is one that requires time and trouble to work out. In these days there are a number of reliable varnish firms who will gladly advise manufacturers as to the best varnishes for various uses, and this is generally the best way to get good results. State your requirements in detail to a good varnish maker, and he will be able to give you a varnish that will meet your needs.

Answer by F. Hollamby, Toronto

Regarding the query of Evans & Company, I think the most frequent cause of trouble with varnishes is adulteration with resin. Pure varnish is made with Kauri gum, but there is sometimes a temptation to put resin in on account of the difference in cost. Resin can be detected by leaving a wet cloth, or pad, on the varnished surface after the varnish has been allowed to become hard. The presence of resin will cause the varnish to wrinkle up. Pure varnish can be scraped off in a clean ribbon. Resin causes brittleness of the varnish, and consequently the ribbon will show ragged, but it is possible that in extreme cases only a sharp powder can be scraped off. If these tests are used in connection with experiments in the general appearance obtained by the use of varnish I think Evans & Company should have no trouble in determining the kind of varnish that will best suit their needs.

* * *

Answer by The Dougall Varnish Company, Limited

The best answer to this question is: Purchase from a reliable house and let them inform you as to the facts about the different grades of varnishes. Any tests of durability and general usefulness reqûire a considerable time for their completion, and often their preparation is only reliable in the hands of an expert. A slight error or variation frequently means a big difference in results. Panels may be brought up with varying coats of varnish. These may then be cut in half, one portion being retained indoors, and the other, after having been sealed on back and sides, exposed out-of-doors, preferably at an angle of 45 degrees to the south. A quick result may be secured in this way, particularly with an interior varnish. Frequent observations should be made for lustre, checking or cracking, and powdering when rubbed with the fingers.

* * *

Answer by Albert Hudson, Hespeler, Ont.

No absolutely reliable tests can be applied to varnishes with a view to determining their durability, but there are certain pointers which may help materially in that direction. The first of these is to varnish a prepared board and allow it to become perfectly dry, just as in ordinary varnishing practice. Then take a pad made of several thicknesses of felt, saturate it with water, and place it upon the prepared surface, allowing it to remain over night. If the varnished surface shows up bright and clear in the morning the varnish may be accepted as a durable one, but if it shows up white water has been absorbed, and the varnish is not proof against water or weather. If it remains white after it has dried out the water has dissolved part of the varnish; hence the varnish is not fit for any purpose where water or dampness can get at it. It is also an indication that the varnish contains rosin, and this, excepting in very small quantities, is an objectionable ingredient in varnish. Rosin is added principally for the purpose of cheapness, and apparently to lower the degree of heat necessary in melting the gum resins which are the chief ingredients of most varnishes. If the varnish is a good one either there will be no white mark, or, if there be one, it will regain its color when dry.

A varnish which dries too quickly contains too much dryer.

A good test of varnish is to scrape off the dry surface of a coat of varnish with a sharp pen-knife. If the varnish is high grade the ribbon scraped off will

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be tough and sharp at the edges, but if there is much rosin in it the edges will be ragged and the film will show signs of becoming brittle. This test is also a very good one for linseed oil.

There are many varnishes for many purposes, and it is most important to select the right varnish for the work in hand.

The most brilliant varnish is made from mastic, the hardest from sandarac, and the toughest from shellac.

Piano varnish has little oil, and dries so hard that it takes a very high polish. This, however, is quite too hard for ordinary use.

Copal varnish takes from a light amber to a very rich dark brown tone.

For interior use, where the surface is subject to a great deal of handling, and where a brilliant gloss is desired, a hard gum, short oil varnish should be used.

For furniture not subject to rough usage a rosin short oil varnish will do; whereas for furniture which comes in for hard use, the medium or long oil varnish is recommended.

Generally, the most durable varnish is a long oil varnish. The lustre is not so good, but the varnish is tougher; and, moreover, the long oil product will take the thinners at a lower temperature than the short oil varnish.

The very best varnish will deposit some sediment while standing in the tank, but it will be less than one-fourth of one per cent. for three or four months. A poor varnish will show from six to seven per cent. sediment during the same period.

If varnish is to withstand the action of water it must contain enough gum to prevent the linseed oil from turning white and milky.

Railway and carriage body varnishes and other durable body varnishes usually contain an excess of oil—hence they are termed "long oil" varnishes.

The quick drying varnish will not prove to be a durable one; slow drying varnish hardens more thoroughtly and retains its elasticity better. Some furniture finishing varnish contains three times as much oil as gum—hence it never becomes hard enough for its purpose. A slight amount of heat, even the heat from the body, is sufficient to soften it. However, most furniture may be finished safely with a varnish containing twice as much oil as gum.

Fuming Oak

"A few days ago I dropped into one of the largest and most up-to-date furniture factories in the country, one that turns out a large quantity of high-class fumed oak, and there I got a new idea regarding the fuming process. The usual way of evaporating ammonia for fuming has been to allow it to drop from a tank outside the vat on to a series of slides inside, and finally into a jar on the floor, this dropping process extending over a period of from twelve to twenty-four hours. The new method is to place in a long, shallow pan about one-third the quantity of ammonia usually required, and place this over a coil of steam pipes. The advantages claimed for this way over the old method are that a more uniform color is obtained, the work is done in half the time, and much less ammonia is required. I have not yet tried it out myself, but from what I saw in that shop I am convinced that the thing is a success, and I pass it on for readers to try out for themselves.—Rudolph Kilbourne, writing in The Woodworker, of Indianapolis.

Veneers and Panels

Steam Problems of the Veneer Plant

By L. K. Henderson in Veneers

IN the veneer manufacturing industry we have a somewhat different problem at the power end of plant from that existing in any other branch of the wood-working industry. The exception to this, of course, is the veneer sawing plant, where the problem is practically the same as that of the saw-mill or any other wood-working plant. In the veneer cutting plant, whether it be with slicers or rotary machines, there is a pretty heavy call for steam, entirely aside from that required in the form of power for driving machinery. It is really a problem of steam rather than a problem of power, because steam is needed for the boiling vats in the preparation of stock to be cut, and it is required afterward in the operation of patent driers and dry kilns. At times there are enough of these special requirements to make the burden of steam requirement heavier for these uses than it is for the actual power of the plant.

Naturally, with existing conditions of this kind, the veneer trade has been a little slow in turning to electric transmission—which is perhaps a mistake, because electric transmission is just as good in the veneer plant as anywhere, and offers just as many chances to save in both power and factory space. The place where people seem to get tangled up and trip themselves on this problem is in the fact that for a veneer cutting plant there does not seem to be the same chances to buy outside power as in some other wood-working institutions. In other words, some steam plant is necessary in any case, and it is reasoned that the steam plant might just as well be a little larger and supply all the requirements of the factory.

This is all right, too, but there are two general ways to take up electric power: one is to buy the current from the outside, from some central power station, and the other is to produce your own current with your own power plant. There is no reason why a man should not use electric transmission advantageously in the veneer plant and make his own juice. If he is near a big electric power station it becomes a question of whether he can make his power current cheaper than he can buy it. If he can buy it economically he may well buy what current he needs for his power appliances, and then simply operate a steam heating plant at low pressure to supply the needs of the boiling vats and the driers and glue room.

The isolated plant in the country, if it is a plant that goes beyond the mere use of two or three rotary cutting machines and their clippers, should find it advantageous to install a dynamo and motors and use electric transmission. The advantages should be especially noticeable if the plant is large and complicated and includes panel work as well as veneer cutting, for it reduces the friction waste and cuts out the long line of heavy shafting, and makes it simple and easy all round.

The important problem of the power plant, however, is steam producing, for, as stated above, there must not only be steam produced for the power plant, but there must be steam for boiling the blocks and for heating the dry kilns and for glue room use.

There has never been any specific compilation of the steam power units required to boil the blocks for a day's cutting on a rotary veneer machine. Some day we may get this, and when we do there will probably be some startling figures. Sometimes this heating is done in part by the use of exhaust, but it takes a lot of exhaust steam to heat a boiling vat, and it is seldom indeed that blocks are boiled and prepared for cutting without the use of a pretty strong stream of live steam. Fortunately, much of the heaviest use of this live steam comes at night, when the machinery is idle, so that the boiler plant is not taxed so heavily as it would be if all the steaming were done in the daytime. As it is, however, the winter season is quite commonly a very trying one on the steam equipment of the veneer plant, and too often the trials of the fireman and the engineer are aggravated by the adding of an extra kiln or an extra drier and the failure to take into consideration that these things draw heavily upon the steam-producing capacity.

There is perhaps more steam lost through radiation in the average veneer plant than in any other institution using an equal amount of power. This is because the diversified uses of steam call for extensive piping, often for long distances out in the open air. Once in a while one sees a veneer plant so arranged that the boiling vats are just at the back of the steam boiler, so as to shorten the pipe line connection. Too often, however, they are a considerable distance away. Some have been observed that are more than 100 ft. distant from the power plant. Where this happens, even if the piping is put under ground and reasonably well protected, there is considerable loss through radiation.

Quite often the pipes from the boiler to the vats, to driers and kilns, go across in the open air, practically unprotected. During the cold days of winter the loss through this exposure of pipes is enormous. Therefore, the first step toward greater efficiency should be that of covering and insulating the pipes. They should not be merely wrapped up like a sore leg or boxed in indifferently, but careful search should be made for the best practical insulating material to use. Then it should be applied carefully, and, where the pipes are exposed, painted over for protection.

Just to help complicate the steam problem of the veneer plant a little more, it generally has for fuel about the wettest, soggiest wood that it is possible to get. The saw-mill has its sawdust and its green slabs and strips. In sawing pine these have enough resin in them to make them burn readily. When it comes to the veneer plant, however, there is not only green wood, but it has been boiled until it is surcharged with water. In other words, the fuel mainly relied upon for making steam in the veneer plant is the waste cuttings and cores from the veneer blocks themselves—

wood that is so impregnated with water that one has to build a pretty hot fire to burn it.

At some of the city plants this fuel element may be augmented with a little coal, and, if a panel plant is operated in connection, there will be some dry trimmings from this to help along a little. This is true, too, of the country plant making panels or trimming up stock that has a percentage of dry trimmings to go in with the green, water-charged waste that is used for firing the boiler. There is not, however, a much more discouraging proposition to the average fireman in the steam-producing line than that of producing steam for power and the preparation of blocks for a rotary veneer plant where practically the only available fuel is the fresh, wet veneer and the slabs and cores. It calls for large boiler capacity and an abundance of furnace room. This is one place where the Dutch oven extension is practically essential if one would get anything like normal steaming capacity out of the boiler. It is also a good place for hot-blast blowers.

Sometimes the condition of the fuel may be improved by running it through a hog and grinding it up into chips, but often the hog, especially the old type familiar to the saw-mill, requires so much power to drive it that it becomes a question whether it is better to save this power or to use it and improve the fuel. Of late years there has been offered a special type, or perhaps several of them, of veneer hogs, machines designed specifically for reducing veneer scrap to better fuel, and some of these are certainly worthy of attention on the part of those who are depending mainly on water-soaked veneer scraps for fuel.

One might find a very good argument in favor of drying, trimming, and even making panels at the rotary veneer plant for the sake of getting the waste and trimmings from this as a dry fuel to help make steam. However, the big point about it all is this: that there is no class of wood-working institution where steam is more essential than in the veneer plant, and there is perhaps no line of wood-working in which there is a more difficult problem in the matter of fuel. It becomes important, therefore, for the man in charge of the power plant at the veneer factory to study carefully and thoroughly every modern plan and device that offers to assist steam economy. Higher efficiency is getting to be the order of the day in every isolated plant, and the requirements of the veneer plant are so trying in many respects that here, if anywhere, there should be more than the usual attention centred upon the subject of the greatest possible efficiency all round.

It is not merely the best type of furnace and the best condition of boiler walls, and the many little details of that kind, that should be loked after; there are other problems—peculiar problems. There are traps and reducers to be used for the glue room, and the steam must be reduced down to a merely normal pressure, and for some of the driers there must be a reduction of steam again, and there are many incidental things of this kind that lead to condensation and to loss through radiation. These should be studied carefully and the steam specialty people consulted with a view to getting the very best things offered in the way of equipment to minimize loss in transmission and through radiation. It takes time and costs money to do these things, but in the end it should be money saved, for there is many a veneer plant where good money is going to waste right along through leaks of one kind and another in the steam equipment.

Modern Methods in Preparing Glue

NO matter what changes may be made in the production of glue, animal glue will be largely consumed by the woodworking industries of the world for many years to come, writes C. M. Mackay in the Furniture Manufacturer and Artisan. All that there is to know about glue is not known yet by a long way, and there will be a gradual opening up of truths regarding this product and its use as the years go by. Even within the last few years much has been learned, and many changes made, both in the manufacture and use of glue, and others are being contemplated. A few years ago users of glue talked about "cooking" glue before using it, and although time has shown that the more they cooked it the weaker it became, they clung to the method with a superstitious tenacity, believing that they were improving the quality. But to-day we talk about "dissolving" the glue, and the method that will do this with the least heat and do it within a reasonable time is considered to be the best. The man who, to-day, would talk about cooking his glue before using it would be looked upon as one still living in the past.

To-day there are those who believe it is necessary to soak glue for from ten to twenty-four hours in cold water before dissolving in order to get the best results. But there are those who, by careful experiments, have satisfied themselves that this soaking is not only not beneficial, but that it is more or less harmful. Especially is this thought to be so in hot weather, when decomposition of glue sets in very rapidly after it is once reduced to the fluid. It might not be well to throw the glue at once into the hot water, but the dry glue can be put into the dissolver with warm water, and the temperature then gradually raised to the desired point.

A great many people prefer to buy their glue in sheets or cakes instead of in ground form. But the only advantage the cake has over the ground glue is that the buyer can see what he is getting—although even then he is not sure, because no man can tell positively from the appearance of glue just what its quality is. That is one reason why some people prefer to sell glue by sample instead of selling according to grade. If the goods you get look as good as the sample you bought from, you have no room to kick even though they do not test up to the quality you would expect for the price.

If you are buying your glue from a house that you cannot trust to give you the grade you order in ground form, my advice would be to change houses. If you buy your glue according to a grade, and you know what that grade should test, you can have your house grind it for you and then test it when it comes in. No matter how reliable the house, mistakes may happen, and glue should be tested to guard against errors. The reason why ground glue is preferable to cakes or sheets is that the fine particles will dissolve more readily than will the large pieces, so that in a very short time after glue and water come together the mixture is ready for use. This is an advantage in many ways. If one mixes what he thinks is enough for the day, but toward the end of the day finds that he is going to run short, he can prepare a small quantity on short notice to last out the day. In this way one can always have fresh glue in the highest state of efficiency, and never be troubled with its getting stale and sour.

There are still a few people who mix their glue solution by guess. They dump in some glue and pour in water until they think there is enough. And there are also some who make a pretense of measuring—but

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

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THE OHIO VENEER COMPANY

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Foreign and Domestic Veneers and Hardwood Lumber

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ROBBINS VENEER AND LUMBER CO.

Ellicott Square - - BUFFALO, N.Y.

Carry large stock in Buffalo

Rotary Cut Veneers

Sheets or Dimension—all Thicknesses.

Birch, Gum, Oak, Poplar, Ash, etc.

Specialize Door Veneers—Door Panels.

MAKE all kinds of Panels—Tops, Drawer Bottoms.

Write us for prices. We save freight. Prompt shipment.

HB Reg. U.S. Pat. Off

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VENEERS and LUMBER

In the Domestic Hardwoods

ANY THICKNESS,

1/24 and 1/30 Slice Cut

(Dried flat with Smith Roller Dryer)

1/20 and thicker Sawed Veneers, Band Sawn Lumber.

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Sliced, 1-28, 1-24, 1-20-in.
Sawed, 1-20, 1-8, 3-16, 1-4-in.
We specialize in highly figured veneers in the right widths for panel faces, stiles and rails.
ENGLISH BROWN OAK,
CIRCASSIAN WALNUT,
BLACK WALNUT,
OAK, Plain and Quartered.
Sawed, 1-20, 1-8, 3-16, 1-4-in.
Sliced, 1-24, 120-in.
Rotary Cut, 1-24, 1-20, 1-16, 1-6.
POPLAR, YELLOW PINE,
BIRCH AND GUM
For faces, centers, backs, cross-banding and bottoms.

LUMBER

MAHOGANY,
CIRCASSIAN WALNUT,
AMERICAN (Black) WALNUT,
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PANELS

1-4, 5-16, 3-8-in. 3-ply and 5-ply, standard sizes.

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FOR RENT OR SALE

Building, Machinery and Good Will of a well established woodworking factory situated in a large town west of Toronto. First-class equipment. Factory now in operation. Summer trade now coming in and prospects good for lively business. Address,

5-6 Box 12, Canadian Woodworker, Toronto.

7% INVESTMENT 7% PROFIT SHARING

Sums of $100, $500, $1000 and up. Safe as any mortgage. Business at back of this Security established 28 years.

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WE HAVE BEEN MAKING THE

Best French Glue in the World

SINCE 1818; ALMOST A CENTURY

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Perfection in manufacture from the best raw material makes the quality of COIGNET FRENCH GLUES consistently the highest.

Large stocks at Montreal assure the best of service.

Why not take advantage of these most important factors by using our glues?

At your service for prices and samples.

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The Glue Book

What It Contains:

Chapter 1—Historical Notes
Chapter 2—Manufacture of Glue
Chapter 3—Testing and Grading
Chapter 4—Methods in the Glue Room
Chapter 5—Glue Room Equipment
Chapter 6—Selection of Glue

Price 50 Cents

Woodworker Publishing Co.
Limited
345 Adelaide St. West, Toronto

they measure both the glue and the water. The glue should be weighed, and the water measured. A bucket of dry glue does not always weigh the same. A gallon of finely ground glue is heavier than a gallon of coarse.

I am well aware that there are times when a man may be called upon to set his judgment against his weights and measures, and I have no hesitation in saying that when such a case arises, if he is an experienced man, his judgment should prevail. There are also cases of emergency in which a man cannot use weights and measures. Suppose a man is veneering curly birch on a maple core, and he has to change and veneer mahogany on a basswood core which will require a heavier glue solution than the former. If he is an experienced man he can make this change without resorting to weights and measures, and make the solution 15 or 20 per cent. heavier—not by guess, but by judgment; that is, his judgment tells him when the solution which, by actual weight and measurement as well as his own judgment, was correct for the hardwood has been made sufficiently heavy for the more absorbing wood. But in making up new batches of glue a man should always use the weights and measures—and his judgment too—one as a check upon the other. What is better still is to get a hydrometer and use this along with the weights and measures, together with your judgment. This combination will come as near perfection as possible as a guide in the preparation of glue.

High-Class Veneers

The announcement of the Robbins Veneer & Lumber Company, Ellicott Square, Buffalo, will be found in this issue of the Canadian Woodworker and Furniture Manufacturer. They have opened a warehouse in Buffalo and carry a large stock of domestic veneers, from which they can make prompt shipments. These include rotary cut, sawed and sliced and door veneers. They also handle all kinds of panels for door and wainscot work and are giving considerable attention to dimension cut stock. Their warehouse is located at Seneca and Hamburg streets.

News of the Trade

The Acadia Sugar Refinery Company contemplate rebuilding their cooperage plant at Moncton, N.B.

The Assiniboia Furniture Company, Limited, has been incorporated at Assiniboia, Sask., with a capital stock of $29,000.

C. S. Diffin has leased the woodworking factory of Burpee & Wilson at Avondale, N.B., and will conduct the business in future.

At Pembroke, Ont., fire has destroyed the sash and door factory of the Pembroke Lumber Company. The loss is estimated at about $75,000.

The Moose Jaw Sash and Door Manufacturing Company, Limited, has been incorporated at Moose Jaw, Sask., with a capital stock of $30,000.

Lamarre & Company, St. Remi, Que., manufacturers of sash, doors, and threshing machines, have registered. The incorporators are Horace, Armand, and Maurice Lamarre.

The Western Box & Shingle Company's plant on the

OAK MAHOGANY CIRCASSIAN MAPLE

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PENROD WALNUT & VENEER CO.

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Exclusively Walnut Lumber and Veneers

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Veneer Mills HELENA, ARK.

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The Central Veneer Co.

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Veneers, Veneers Veneers

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Choice Quartered or Plain sawed Veneers,

Quartered or Plain sawed lumber,

or

Dimension Stock

call on or write

C. F. WHISLER

HILLSBORO, OHIO

waterfront at Nelson, B.C., is running steadily. Manager Kitchener has installed a new patent machine for the manufacture of box strips.

The plant and equipment of the Rodney Woodenware Company, Rodney, Ont., has been totally destroyed by fire, involving a loss of about $35,000, which is only partially covered by insurance.

On leaving the company to join the colours, Mr. Norman Kett was presented by the Harriston Furniture Company, of Harriston, Ont., with a cheque for $25. He is the fourth member of his family to enlist.

It is gratifying to learn that the Woodstock factory of Canada Furniture Manufacturers, Limited, has resumed its ten-hour working day. For some time the factory has been running on an eight-hour schedule.

At Breslau, Ont., the Ideal Furniture Company, Limited, has been incorporated with a capital stock of $50,000. The Provisional Directors of the company are A. G. Browning, J. E. McGlade, and J. H. G. Wallace, all of Toronto.

The Pembroke Lumber Company have leased the plant of the Lee Manufacturing Company, at Pembroke, Ont., in order to enable them to complete their contract for the manufacture of shell cases for the Imperial Government.

Allen & Morris, proprietors of a planing mill and box factory at Grand Forks, had only a small force at work in the early part of the season. The box department is now quite busy, some good orders having been placed by the fruit growers of the district.

The Preston Planing Mills, Medicine Hat, Alta., have received an order for 13,000 crates to contain the shells that are to be manufactured in that city. The total value of the order will be about $12,000, each crate being priced at 95 cents, and holding six shells.

Mr. Alexander Baird has accepted a position with the Canada Machinery Corporation. Limited, as Superintendent of their Hespeler factory, in which the company will resume operations at an early date. Mr. Baird was Superintendent for Cowan & Company, Limited, of Galt, for many years.

The Rodney Town Council have decided to submit a by-law to the electors to grant a loan of $5,000 to the Rodney Woodenware Company for a term of ten years. The woodenware company are planning the re-erection of their factory, recently destroyed by fire with a loss of $35,000.

The Nelson Sash & Door Company, Limited, Nelson, B.C., are operating with a small crew, but there is considerable new work in sight. The proprietor, John Burns, took advantage of the dull time to make a trip to the Eastern States, leaving his son in charge. Foreman H. Keefe is in charge of the shop.

The planing mill and lumber yard of Mr. Daniel Barker at North Bay, Ont., were entirely destroyed by fire recently, and his residence was also damaged to the extent of about $1,000. The loss on the mill and yard, which were not insured, is estimated at $12,000. The owner has no plans for rebuilding at present.

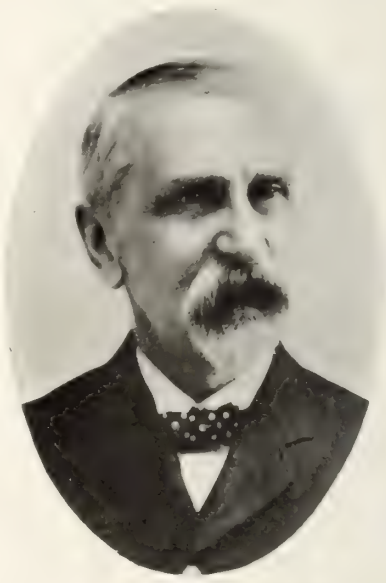
The cheese box factory at Fallbrook, Ont., owned by J. E. Playfair was destroyed by fire recently. Only the engine and boiler and a veneer machine were saved. No insurance was carried, and the loss on the building is estimated at $1,500, and on the machinery at $2,000. The owner intends to resume operations as soon as possible, and in the meantime he is looking for other quarters.

The Bryan Manufacturing Company have been negotiating with the Town Council of Collingwood, Ont., for a loan of $35,000 to assist them in rebuilding their plant, which was destroyed by fire recently. It is proposed to make the loan repayable in seventeen annual installments, and the company have asked that their assessment be fixed at $40,000. In return for this the company would erect a building and install machinery at a cost of not less than $70,000, and employ not less than fifty men.

Work has been commenced at Walkerville, Ont., upon the erection of handle factory to cost $4,000, the owners and architects being Hartwell Bros., Chicago, Ill. The general contractors are the Williamson Construction Company, Road, Walkerville, Ont. The building is to be one storey, frame construction, 60 x 90 ft. The company will require woodworking machinery.

Retirement of an Ontario Furniture Manager

The close of a long career in connection with the furniture manufacturing business at Woodstock is marked by the retirement of Mr. John G. McBeath, who has been Manager of the Woodstock factory of Canada Furniture Manufacturers, Limited, ever since that company took over the plant in 1901. Mr. McBeath was born in Bath, England, and came to Canada in 1853, taking up his home in Woodstock about seven years later. He served an apprenticeship in the cabinet-making trade with John Weeks, of that city, and later spent two years with the Miller Organ Company, from which organization the Karn Piano and Organ Company grew out. In 1876 he became connected with the late James Hay, who operated the factory now occupied by Canada Furniture Manufacturers, Limited.. In 1883 the firm became known as the James Hay Company, Limited, and in 1885 the Anderson Furniture Company was formed, and operated the factory until it was taken over by Canada Furniture Manufacturers, Limited. Mr. McBeath held positions of responsibility with each of the firms. Mr. McBeath entered the Woodstock City Council in 1906, and occupied the Mayor's chair in 1913. For two years he was President of the Woodstock Board of Trade, and for two years he was a member of the Woodstock Water and Light Commission.



Mr. J. G. McBeath, of Woodstock

We understand that Mr. McBeath will continue to reside in Woodstock.

The death is announced of Mr. James Buchanan, Senr., one of the oldest and most respected citizens of Goderich, Ont. The late Mr. Buchanan entered the planing mill business some fifty years ago, and he was President of the Goderich Planing Mills until three years ago, when he retired, being succeeded by his son, Mr. James Buchanan, Junr.

Trade Inquiries

THE Weekly Report of the Department of Trade and Commerce contains the following inquiries relating to Canadian trade. The names and addresses of the firms making these inquiries can be obtained by those specially interested in the respective commodities upon application to the Inquiries Branch, Department of Trade and Commerce, Ottawa.

Attention may be called to Trade Inquiries Nos. 688 and 689, appearing herewith. The first refers to a South African commission house desirous of obtaining samples and quotations of British Columbia lumber. They state that there is a demand in South Africa for a hardwood which is called "Canadian Pacific wood." It is described as a brownish wood and is used for piles, girders, and shaftings. Quotations c.i.f. South African ports, together with full particulars of sizes, quantities and deliveries are requested. They have at present a special inquiry for the following sizes:—

Length, 5 feet x 16 x 4½ inches.
Length, 5 feet x 18 x 4½ inches.
Length, 10 feet x 16 x 4½ inches.
Length, 10 feet x 16 x 4½ inches.

or in logs 22 inches diameter, length 10 feet 3 inches.

It is also requested that prospective shippers in quoting should give the weights in cube so that the South African rail charges may be estimated in making quotations for inland deliveries.

With regard to the second Trade Inquiry, Mr. W. J. Egan, Trade Commissioner at Cape Town, states that the dealer referred to requests catalogues and price lists on furniture ready for upholstering, packed for export in the knock-down state. The largest demand is for dining-room furniture made of birch and finished in walnut and oak.

There is also a demand for frames and couches and easy chairs made from the common deal. Prices should be quoted f.o.b. Montreal and St. John, also data giving information of the number packed in each crate and the weights and measurements of each crate or case.

498. **Butter boxes.**—A French firm of commission and manufacturers' agents in Buenos Ayres would like to hear from manufacturers of butter boxes. These should be made of spruce or other non-odorous wood. Dimensions and sample of joint used are on file at the Department of Trade and Commerce, Ottawa.

510. **Three-ply wood, etc.**—A London firm of merchants who handle wooden and turned goods of all kinds invite offers from Canadian manufacturers. They particularly seek supplies of three-ply wood.

523. **Plywood.**—A Glasgow house interested in plywood would be glad to know what Canada can offer in variety of sizes.

534. **Hard maple flooring, closet seats.**—A firm in Buenos Ayres would like to correspond with Canadian manufacturers of the above.

688. **Lumber.**—A South African commission house makes inquiry for samples and quotations in British Columbia lumber.

689. **Furniture.**—A Cape Town dealer requests correspondence from Canadian shippers of furniture ready for upholstery in the white and polished.

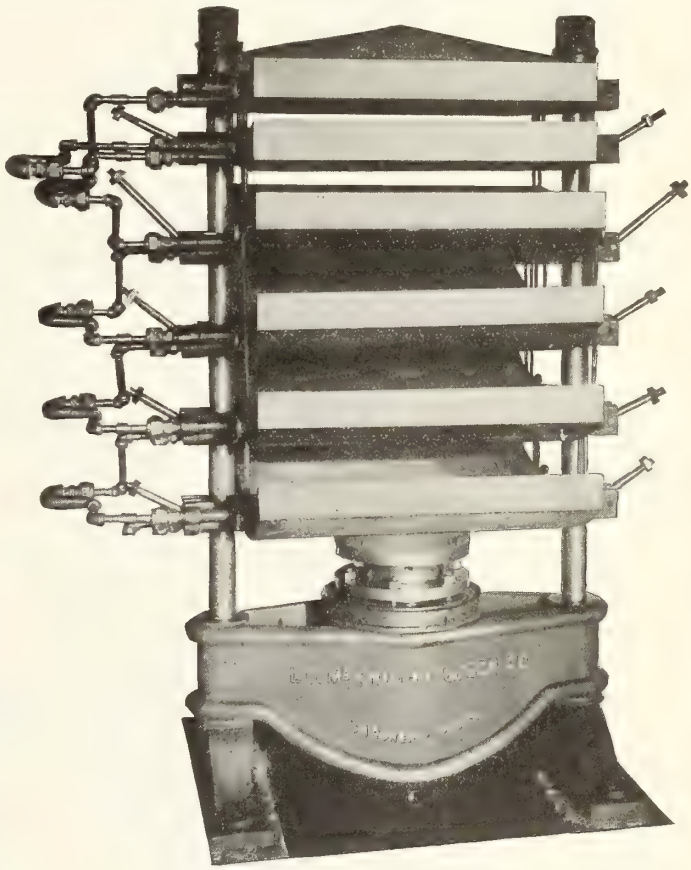
707. **Birch Rails.**—A firm of upholsterers and cabinetmakers are in the market for twenty standards of birch rails cut to assorted lengths, and invite quotations, delivered free London docks, from Canadian shippers, according to the following specifications: Twenty standards of birch rails "off the saw," 2½-inch by 1½-inch, in assorted lengths of 50-inch, 34-inch, 32-inch, 30-inch, 28-inch, 26-inch, 24-inch, 21-inch, and 20-inch.

729. **Box Shooks.**—Quotations are asked for immediately by a Cape Town firm on 100,000 sets of box shooks made from spruce deal, to be delivered not later than November next. Prices must be c.i.f. Cape Town. The sizes are as follows: Sides, 2 pieces, 181inch by 5-inch by 3-16-inch; ends, 2 pieces, 11⅜-inch by 5-inch by ½-inch; tops and bottoms, 4 pieces, 18-inch by 3½-inch by ¼-inch.

744. **Furniture.**—A large importing house in Buenos Ayres handling only the highest class furniture, carpets, etc., would be glad to assist Canadian exporters of high-grade furniture, office and household, who desire to extend their trade to South America.

A Hydraulic Chair Back Bending Press

In two of the Owen Sound plants described in this issue mention is made of the use of chair back bending presses of the type made by the L. G. McKnight & Son Company, of

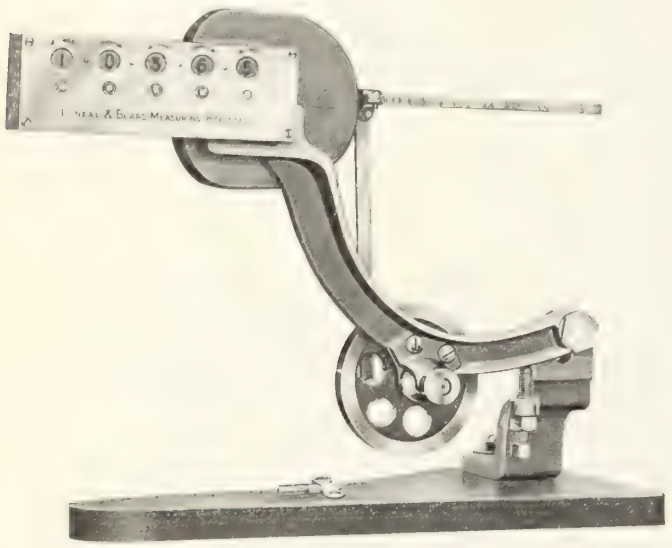


The McKnight No. 101 back bending press.

Gardner, Mass. This firm have been manufacturing chair machinery exclusively for the last thirty-nine years. At the present time they are making a specialty of bending machines. There is a great saving in the bending of chair stock as against the bandsawing method—one of the greatest savings, in fact, that can be made in the manufacture of chairs. We are informed that 666 rockers 1½ inches by 1½ inches by 36 inches long can be obtained from 1,000 feet of 8-inch lumber by the bandsawing method. By sawing these rockers straight and bending in the press, we understand that 1,666 bent rockers can be obtained from the same quantity of lumber. The McKnight No. 101 back bender such as is in use in the Owen Sound factories has five openings, and each form is connected to a live steam supply by swing connections, so that each plate is kept hot until the wood has set to shape. The cut herewith illustrates the No. 101 back bender.

The Morrison Lumber Measuring Register

A machine that should be in use in every planing mill, woodworking plant, and furniture factory, in fact, wherever there is lumber to measure, is the Morrison Lumber Measuring Register, placed on the market by the James Morrison Brass Manufacturing Company, Limited, of Toronto. This register can be attached to the planer, moulder, resaw, sorting table or any other position required, and will measure the stock continuously, giving the result in board or lineal feet as desired. It is a labor saver that will save the cost of itself many times over in a short while, and not only will reduce the running expenses in the mill, but will keep an absolute tally on workmen, as at the end of the day one can see at a glance just how much lumber has been put through each machine. Each machine is solidly constructed with nothing to get out of order, and is guaranteed to be accurate in every detail. It can be instantly adjusted to any machine required. The Morrison Lumber Measuring Register is already in use by leading firms throughout Canada. Full particulars can be obtained by writing to the manufacturers. It will be found worth while.



The Morrison Lumber Measuring Register

The Carborundum Company's Exhibit

PROMINENT among the remarkably interesting and instructive exhibits in the Palace of Machinery at the Panama-Pacific International Exposition at San Francisco is the display of the Carborundum Company, Niagara Falls, N.Y. The accompanying illustration gives some idea of the attractiveness of the display, but beauty of construction and arrangement were not the sole ideas in planning the exhibit. Industrial education was the big idea embodied, and any visitor to the Carborundum exhibit will surely learn some valuable lessons regarding the many and wonderfully varied uses to which Carborundum products are put.

In brief, the plan of the exhibit is to show a wide variety of materials and products in their crude or unfinished state and after they have been cut, ground or finished with Carborundum products. The result has been a wonderful collection gathered from manufacturing plants, not only in this country, but from South America, England, India, New Zealand, Australia, and other foreign countries. The collection embraces materials and products ranging from tooth picks to flooring, from flour mill rolls to needles, from steel shafts to watch dials, from beautiful semi-precious stones to shrapnel shells and malleable castings. It also includes samples of marble, onyx and granite, pearl, cut and engraved glass, sueded skins and boots and shoes. In the grinding, shaping and finishing of every piece shown Carborundum products have played their important part. In each case the particular Carborundum product which did the work is shown.

To display attractively the hundreds of products, a space of about 1,400 square feet was necessary. The materials are shown in full glass mahogany-trimmed show cases. The exhibit is railed off with heavy silk cords of green strung from newels. The back of the exhibit is a classic colonnade, supported by fluted columns finished in old ivory enamel.

In the centre of the exhibit is a wonderful fountain. This fountain, which is shown in the illustration, is built of irregular masses of the wonderfully iridescent Carborundum crystals over which real water plays, splashing into a marble basin, the coping for which was moulded with Carborundum wheels.

From British Columbia comes the cheering word that the B. C. Manufacturing Company, which operates a plant in Queensborough, has closed a contract for one of its products with an Australian firm which will probably mean working day and night for the balance of the year. The contract is for boxes for packing oil in tins, and the order calls for the shipment of 35,000 cases a month. The first shipment went out last month, via the Canadian Pacific Railway and the Canadian-Australian line. As the result of this contract coming on top of the firm's regular output the B. C. Company's plant is now running a partial night shift as well as the ordinary day shift. A full night shift will be put on at on early date. Incidentally, it may be mentioned, the B. C. Manufacturing Company is the only concern in British Columbia making veneer fruit boxes, all of which formerly came from across the line. This year the Canadian concern has secured a large proportion of the Fraser Valley orders for this product.

The Carborundum Company's Exhibit at the Panama-Pacific International Exposition at San Francisco.

We are prepared to quote close prices on

Plain Quarter-cut Oak, Mahogany, Birch, Etc.

both from Toronto stock and for quick delivery from the mills in the different thicknesses and sizes. Our Oak includes both American and English manufacture.

We have a small assortment of ALDERLITE in 3/16″ and 1/4″ in large sheets which we can ship immediately.

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The saw can be set to cut at any angle and can be raised or lowered 8 inches. This operation makes no difference to the belt as is the case with other makes of machines. There is no overhanging slide. The table is clear of all obstructions; all work is in full view, and is operated with 1½ h.p. Motor.
Patented in U. S. A., January 16, 1912. Also in England, Australia and France. Other patents pending.

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THE CANADA MACHINERY CO.
298 St. James Street, Montreal

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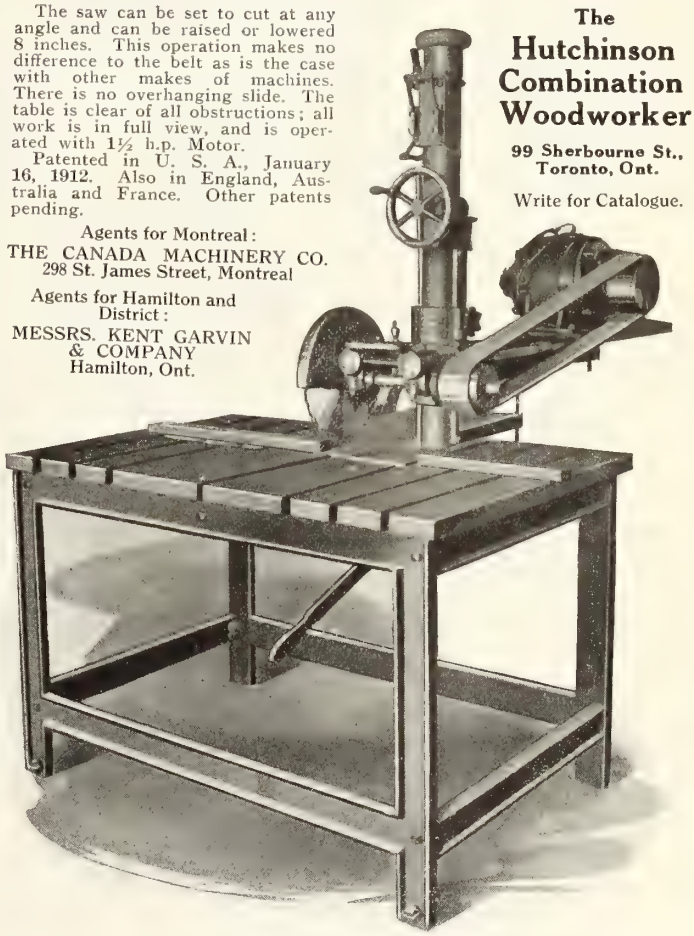
MESSRS. KENT GARVIN & COMPANY
Hamilton, Ont.



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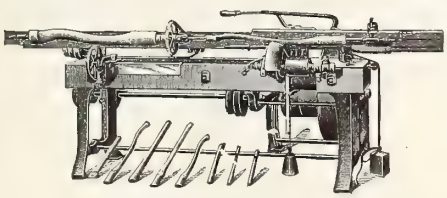
Handle Lathes, Bolting and Blocking Saw Machines, Handle Knobbers, Polishers, Disc Wheels and Throaters.



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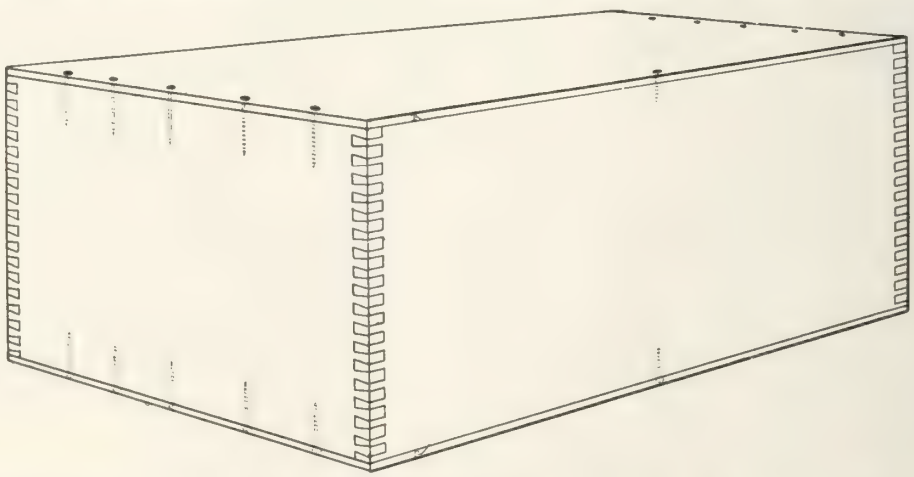

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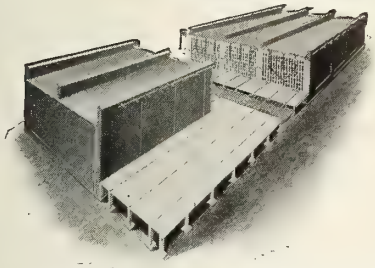

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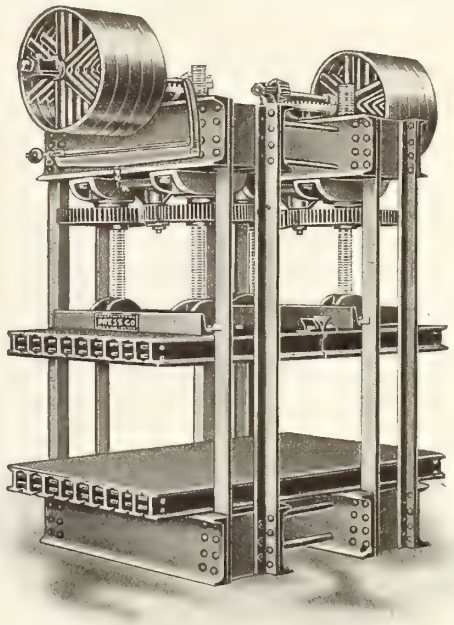

WRITE FOR BULLETIN C 1.

Canadian Boomer & Boschert Press

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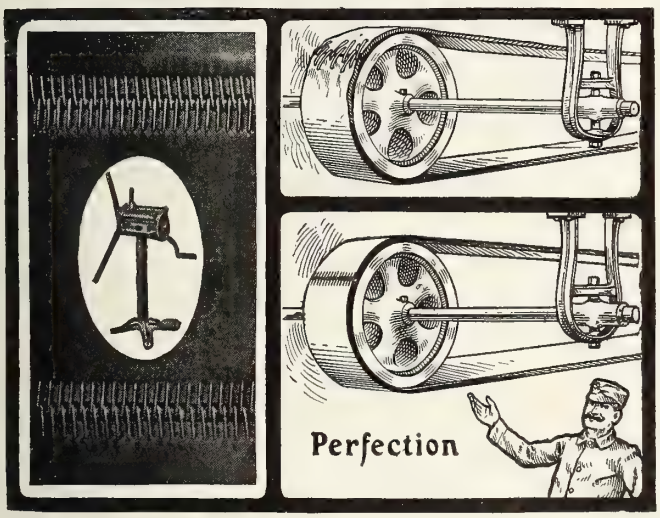
"Jackson Lacer"



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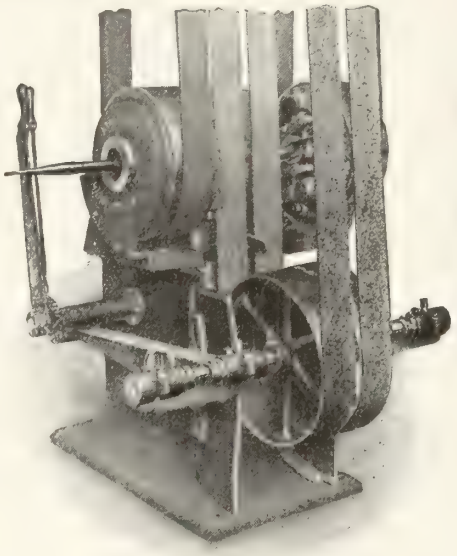

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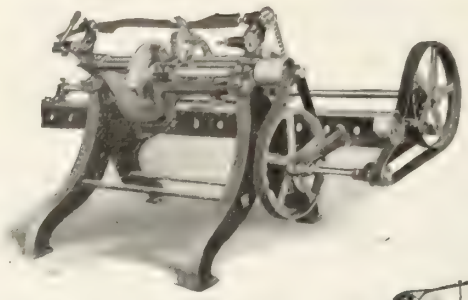

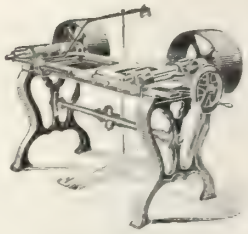

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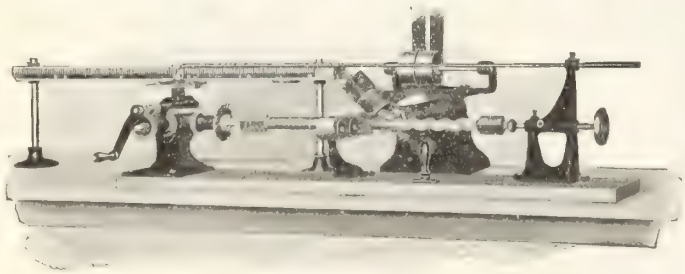

This machine will produce twist and spiral Columns, Balusters, Table Legs and Pedestals, Chair Posts and Spindles, etc., right and left turn.

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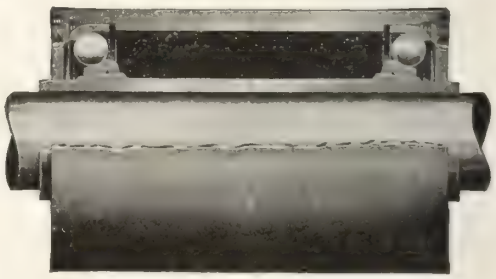

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1 car 8/4 S. W. Chestnut.
3 cars 4/4 No. 3 Common Chestnut.
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½ car 8/4 No. 1 Common and Better Chestnut.
1 car 4/4 Saps and Select Poplar.
2 cars 4/4 No. 2 Common and Better Poplar.
1 car 5/4 No. 2 Common Poplar.
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The "Canadian Woodworker" Buyers' Directory

For Alphabetical Index see page 4

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Canadian Linderman Machine Company, Woodstock, Ont.

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BELTING
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Sheldons, Limited, Galt, Ont.

BLOW PIPING
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

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Whitney & Son, Baxter D., Winchendon, Mass.

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Pryibil Machine Co., P., New York City.

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Carborundum Co., Niagara Falls, N.Y.

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Grand Rapids Hand Screw Co., Grand Rapids, Mich.
Palmer & Sons, A. E., Owosso, Mich.
Simonds Canada Saw Company, Montreal, P.Q.

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Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
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Hutchison Woodworker Co., Toronto, Ont.

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Berlin Machine Works, Ltd., Hamilton, Ont.
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Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.

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Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

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Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Invincible Blow Pipe Company, Toronto.
Sheldons Limited, Galt, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

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Marietta Paint & Color Co., Marietta, Ohio.
Schmidt Co., Walter K., Grand Rapids, Mich.

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Pryibil Machine Company, P., New York.

FLUTING AND TWIST MACHINE
Pryibil Machine Company, P., New York.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto, Ont.

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Delany & Pettit, Limited, Toronto, Ont.
Perkins Glue Company, South Bend, Ind.

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Palmer & Sons, E., Owosso, Mich.

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GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio

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The Carborundum Co., Niagara Falls, N.Y.

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Petrie, H. W., Toronto.

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Pryibil Machine Company, P., New York.

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The Carborundum Co., Niagara Falls, N.Y.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

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Pryibil Machine Company, P., New York.

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Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

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Nash, J. M., Milwaukee, Wis.
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Kosse, Shoe & Schleyer, Cincinnati, Ohio.
Kraetzer-Cured Lumber Co., Moorehead, Miss.
Luehrmann Hardwood Lumber Co., St. Louis, Mo.
Mowbray & Robinson, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Powell Myers Lumber Co., South Bend, Ind.
Prendergast Company, Cincinnati, Ohio.
Shiels & Company, Chas. F., Cincinnati, Ohio.
Spencer, C. A., Montreal, Que.
Wilcox & Knapp, Conneautville, Pa.

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Perrin & Company, Wm. R., Toronto, Ont.

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Knechtel Bros., Limited, Southampton, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.

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Galt Knife Company, Galt, Ont.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.
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Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

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MITRE MACHINES
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MITRE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

MITRE SAWS
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Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Co., Montreal, P.Q.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Nash, J. M., Milwaukee, Wis.

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Lightfoot, Stanley, Toronto, Ont.

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Whitney & Son, Baxter D., Winchendon, Mass.

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Chicago Machinery Exchange, Chicago, Ill.

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Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

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Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shimer & Sons, Samuel J., Galt, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

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Perrin & Co., Wm. R., Toronto, Ont.

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Pryibil Machine Company, P., New York.

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Petrie, H. W., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

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RIP SAWING MACHINES
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Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

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SANDERS
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Black Bros. Machinery Co., Mendota, Ill.
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Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pyribil Machine Co., P., New York.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Invincible Blow Pipe Company, Toronto, Ont.
Sheldons Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.

SPRAYING APPARATUS
De Vilbiss Mfg. Co., Toledo, Ohio.

STAINS
Marietta Paint & Color Co., Marietta, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass.

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STORE FIXTURES & FITTINGS
Reflector & Hardware Specialty Mfg. Company, Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

TRUCKS
Standard Dry Kiln Co., Indianapolis, Ind.
Sheldons Limited, Galt, Ont.

TURNINGS
Knechtel Bros., Limited, Southampton, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Whitney & Sons, Baxter D., Winchendon, Mass.

UNDER-CUT SELF-FEEDING FACE PLANER
Fay & Egan C., J. A., Cincinnati, Ohio.

UNIVERSAL WOODWORKING PLANER
Elliot, W. A., Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

VARNISH SPRAYER
De Vilbiss Mfg. Co., Toledo, Ohio.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

VENEERS
Central Veneer Co., Huntington, W. Virginia.
Cincinnati Veneer Company, Cincinnati, Ohio.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Dupre & Company, C., Toronto, Ont.
Goshen Veneer Company, Goshen, Ind.
Haughton Veneer Company, Chicago, Ill.
Hoffman Bros. Company, Fort Wayne, Ind.
Huddleston-Marsh Lumber Co., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Strong Veneer Company, Jamestown, N.Y.
Waetjen & Co., Geo. L., Milwaukee, Wis.
Whisler, C. L., Hillsboro,' Ohio.
Wisconsin Seating Co., New London, Wis.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Black Bros. Machinery Co., Mendota, Ill.
Canadian Boomer-Boschart Co., Montreal, Que.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

WOOD FINISHES
Marietta Paint & Color Co., Marietta, Ohio.

WOOD TURNING MACHINERY
Berlin Machine Works, Ltd., Beloit, Wis.
Shawver Co., Springfield, Ohio..

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

WOOD SCREWS
Robertson & Company, P. L., Milton, Ont.

WOOD SPECIALTIES
Knechtel Bros., Limited, Southampton, Ont.

WOODWORKING CUTTERS
Galt Knife Company, Galt, Ont.

YELLOW PINE
Prendergast Company, Cincinnati, Ohio.

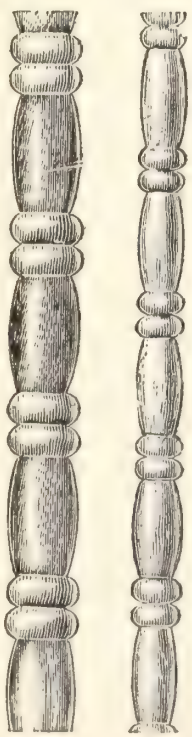
"KNECHTEL'S"

Bead and Turned

MOULDINGS

ARE

Recognized Leaders



79 80

We have a large variety of designs from which to choose, made from first and second kiln-dried Birch or White Oak; also any other wood desired.

We also carry a complete line of plain, embossed, rope and spiral mouldings.

Our illustrated catalogue will prove a great help to you. Send for your copy today.

114

Knechtel Bros., Ltd.

Southampton, Ont.

1913 Edition
"Practical Pattern Making"

A Practical Work on

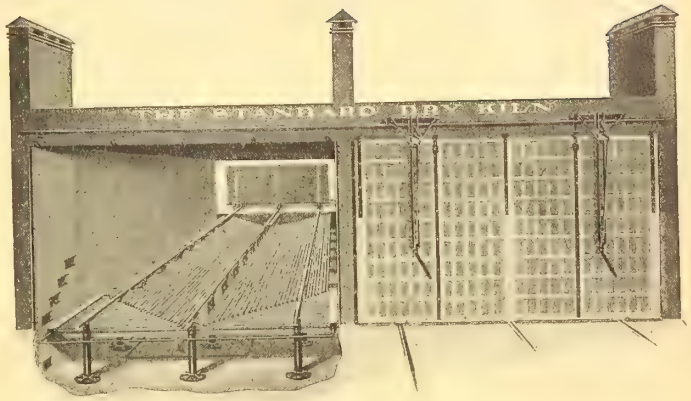
The Art of Making Patterns, written by a pattern-maker with thirty years' experience. Contains information on Pattern Making and Pattern-Makers in general, also a detailed description of the necessary materials and how to use them. Then the tools, both hand tools and machine tools, with special chapters on the Lathes, the Band Saw and the Circular Saw, with many examples of work which may be done on these machines.

A complete section of illustrated examples of Pattern-Work in wood, with many pages of metal pattern-work, Gating and Plate work. Both Vibrator and Stripping Plates are shown. Specific instructions for plaster work are given, and finally, the cost, marking and record of patterns are explained and illustrated.

By F. W. BARROWS

Price $2.00

CANADIAN WOODWORKER
345 Adelaide St. West, TORONTO



Drying Troubles Disappear

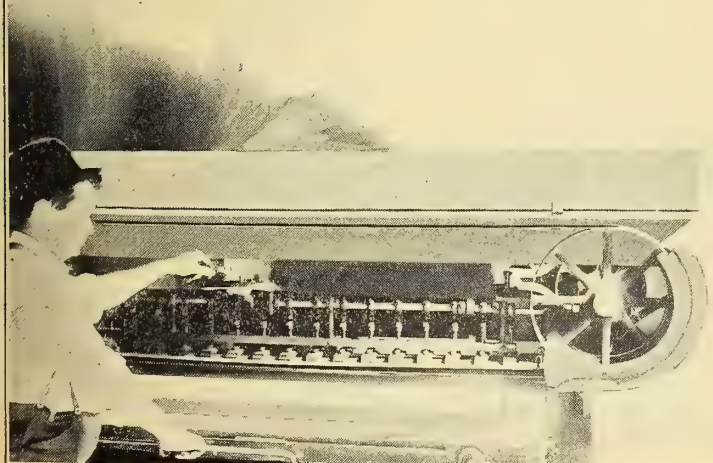
wherever The Standard Moist Air Dry Kiln is installed. Here is a drying system so far perfected that it **really is** adaptable for drying the finest hardwoods. In

The Standard Dry Kiln

the drying elements are so easily and so exactly controlled that anyone can operate it with the most satisfactory results.

Get our List of Users and read what they say. We'll send it with the catalog on request. Address: The Standard Dry Kiln Co., 1560 McCarty Street, Indianapolis, Ind.

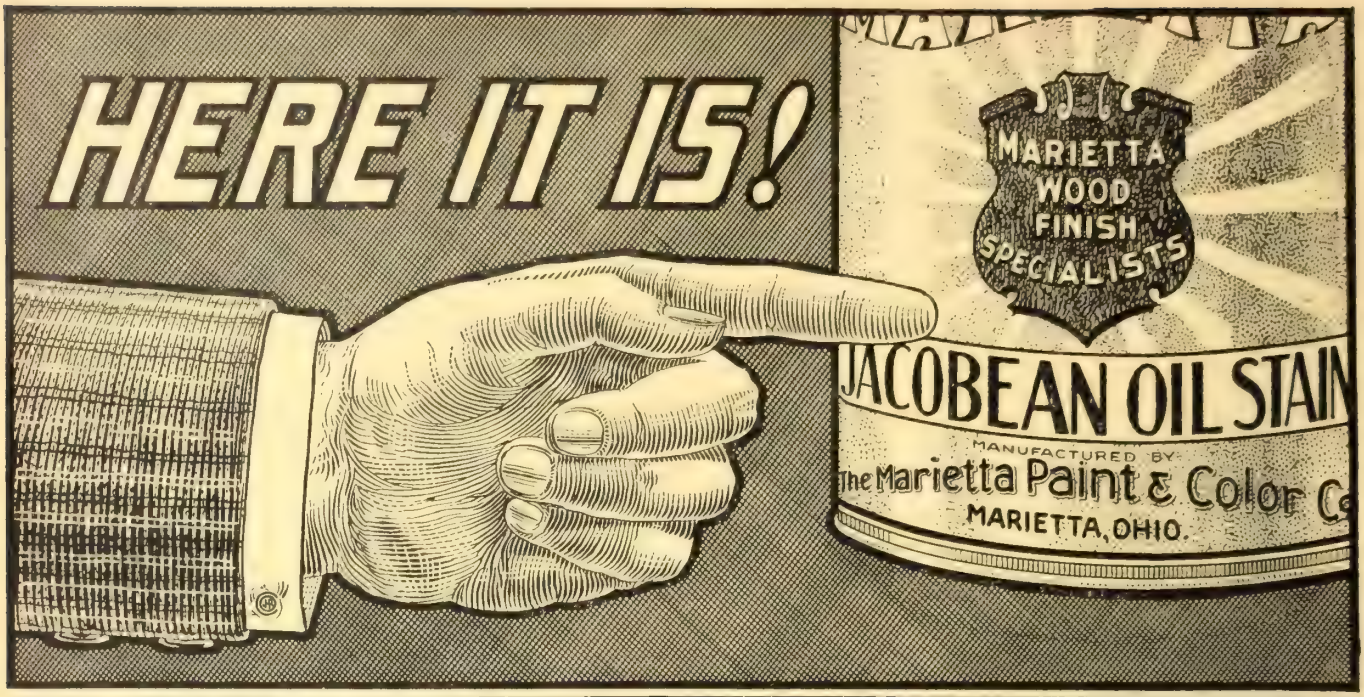
Carborundum Brand Garnet Cloth



For real sanding service—for clean, fast cutting, uniformity of finish and long life use Carborundum Brand Garnet Cloth. Put it on your belt sanders, it will hold its shape, hold its grain, cut fast, and every inch of the cloth is uniformly coated with hard. sharp, clean Garnet grain. Carborundum Brand Garnet Products are made right and of the best quality of materials.

Send for working samples

The Carborundum Company
Niagara Falls, N. Y.
New York Chicago Boston Grand Rapids Philadelphia
Cleveland Pittsburgh Cincinnati Milwaukee
Reisholz, Ger. Manchester, Eng.



IT'S the very latest—the new Jacobean stain, worked out by us for the Jacobean designs which are now the rage with progressive furniture manufacturers.

We have produced, after long and careful laboratory work, what is now universally accepted as the correct Jacobean shade.

It is best described as OLD BROWN. It is a deep, dull brown with the appearance of having been aged by years of service. It is an oil stain, is easily applied with the brush and is practical in every sense.

Write for sample panels.

The Marietta Paint & Color Co.

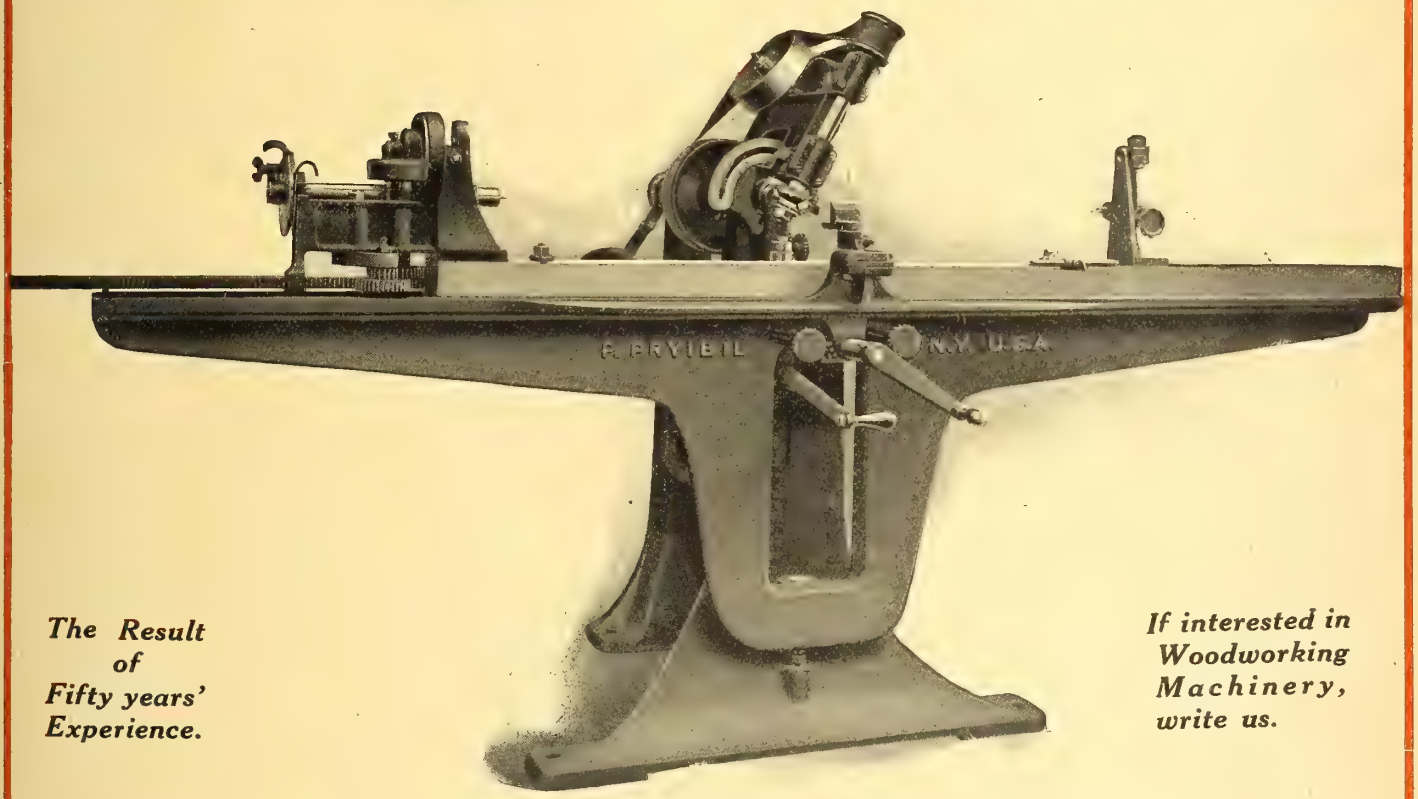
Marietta, O.

MARIETTA WOOD FINISH SPECIALISTS

Volume Fifteen TORONTO, JULY, 1915 Number Seven

CANADIAN WOODWORKER and Furniture Manufacturer

Jacobean Twist Work



The Result of Fifty years' Experience.

If interested in Woodworking Machinery, write us.

This machine will produce all kinds of spiral or rope mouldings, either straight, tapered, curved or oval. It will make right, left, and pineapple cuts and will do straight and irregular fluting. It will cut from one to six threads on a piece, and will make any degree of twist from one turn in one and one-half inches of length to one in ten and one-half inches.

The cutters are similar in shape and arrangement to those used on variety shapers, and are made of the same steel. They revolve always in the same direction, whether the twist be right or left, and one set will produce several different shapes of work. Changing from one degree of twist to another, or from right to left, takes less than one minute. This machine will swing eight inches, and will take 5 feet to 10 feet between centres, according to length ordered.

A Medallion Fluting Attachment will produce radial fluting on flat work up to 9 inches square, or 6 x 12 oblong.

P. Pryibil Machine Co. 512-24 W. 41st. St. New York City

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Tough and Tenacious Tannage

MAKES

"Crown" Planer Belting

Ideal for heavy fast work where rough wear and heat are present.

Different tannages of hides impart different properties to the finished leather The hides used in 'Crown" planer belting are tanned to produce a very tough and tenacious leather that will stand the roughest usage without injury. "Crown" planer belting is ideal for high speed work on planers, matchers, etc., and will stand extreme frictional heat. It may be run under heavy loads at high speed over small pulleys without starting any joints or otherwise being harmed.

We tan all our own leather in our own tanneries to manufacture our belts. We have been established since 1876 and all the discoveries of modern science cannot refute our old slogan, "Leather, like gold, has no substitute."

Write us for prices and state where belt is to run.

Made in Canada

Sadler & Haworth

Tanners and Manufacturers

Toronto 38 Wellington St. E. | **St. John, N.B.** 119 Prince William St. | **MONTREAL** 511 William St. | **Winnipeg** Galt Building | **Vancouver** 217 Columbia Ave.

Gang Dovetailing Machine

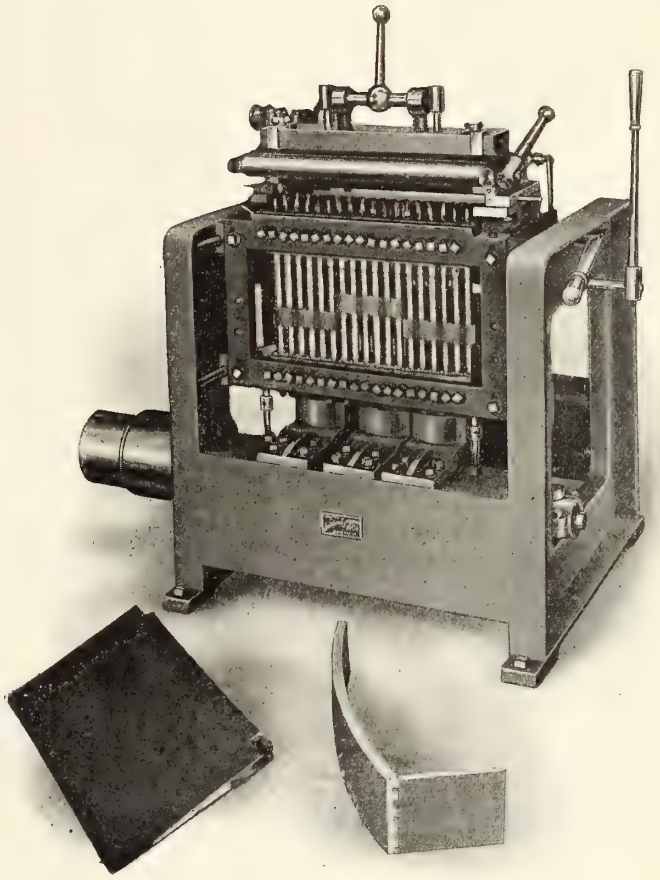
For Dovetailing Ammunition Boxes

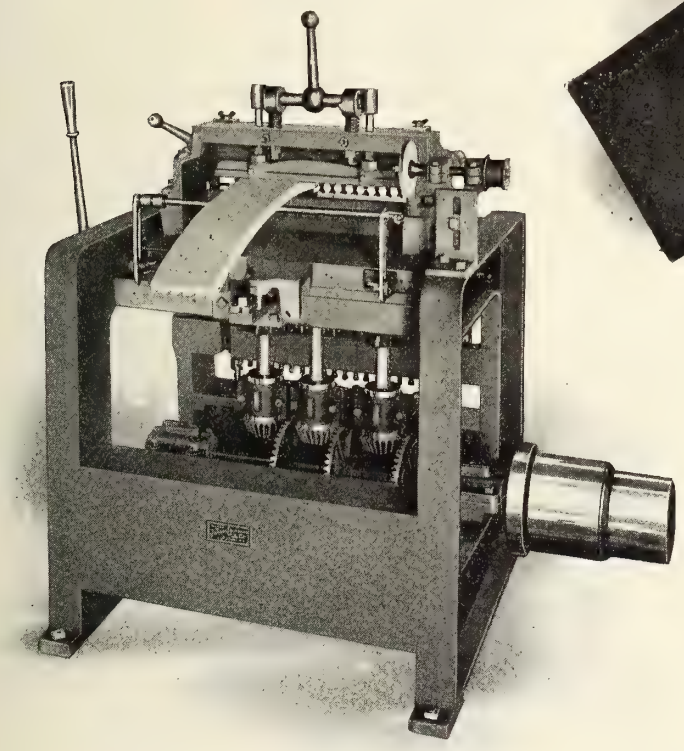
Two views are here shown of our

No. 90
Gang Dovetailing Machine

The latest and most efficient machine that has yet been produced

This Dovetailer can be made to do either the closed end drawer joint or the open end box joint, and can be changed from one joint to the other at a very small cost.





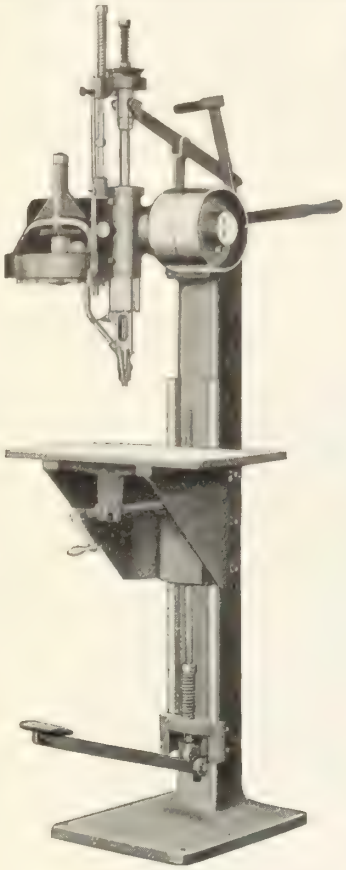
The frame is well proportioned and very strong. All belts are now done away with except the belt drive from the line shaft. This is important, as it occupies only one-third the floor space usually given to a machine of this class and reduces belt cost to the minimum.

A large number of these machines, installed during the past three years, are giving excellent satisfaction. Our guarantee goes with each machine.

We also manufacture a Special Two Spindle Boring Machine and Clamp for use in making shell boxes

Jackson, Cochrane & Company

Berlin, Canada



No. 2 Standard Type Automatic Screw-Driving Machine.

The Only Way to Drive Screws

There is a stage-coach method and a modern method of doing everything. When it comes to driving screws the only modern way is with an Automatic Screw Driving Machine, which means greater and better production and greater profit.

The Reynolds Automatic Screw-Driving Machine

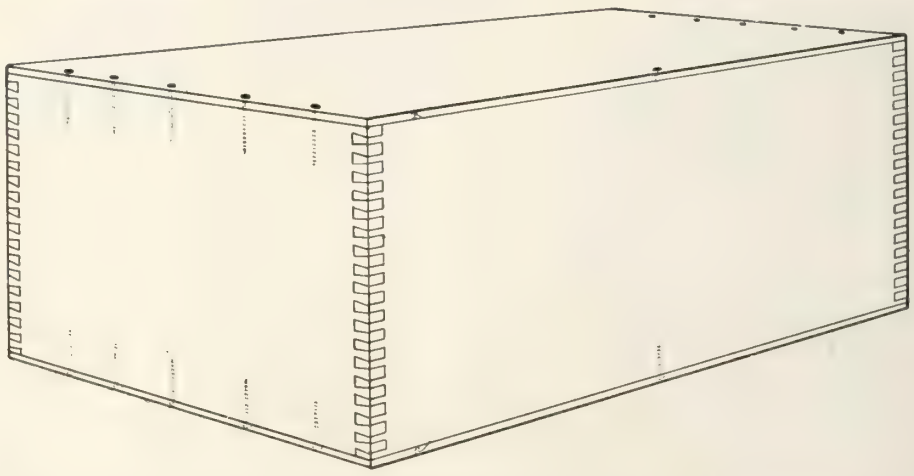
is guaranteed to produce results. It is no experiment. The No. 2 Standard Type, shown herewith, is particularly suited for placing the screws in the straps of shrapnel boxes. It may be fitted to drive, without change or adjustment, any three consecutive sizes flat or round head, or two sizes filister head, No. 6 to 14 inclusive, wood or machine screws, or three sizes flat or round head, or two sizes filister head machine screws up to No. 20. All the above up to 1½ inches long if smaller than No. 10, or up to 1¾ inches long, No. 10 or larger. Fitted with boring attachment if desired.

Many Machines in Use in Canada.

Ask for our Catalogue.

REYNOLDS PATTERN & MACHINE CO.

101 and 103 Third Ave., Moline, Ill., U.S.A.



Shrapnel Boxes can be made better and cheaper on a set of Wedge Dovetail Box Machines

To frame up the handsomest and strongest box at the least cost a set is required consisting of

WEDGE DOVETAILER—Cuts Wedge Dovetail with circular saws

WEDGE DOVETAIL SQUEEZER—The most powerful squeezer made, will squeeze so tight a fit of pins and grooves that glue and the heavy cost of applying glue is unnecessary.

WEDGE DOVETAIL TRIMMER—With circular saws, two corners of the box are trimmed neat and clean at each operation.

We guarantee 400 SHRAPNEL BOXES PER HOUR with a crew of five. This does not include putting on tops and bottoms.

St. Paul Machinery Mfg. Co. - St. Paul, Minnesota

John!—

"We can't stand for more of this low grade sanding," says the Superintendent. "There's no end of kicks on our finish, and it's costing like Sam Hill too."

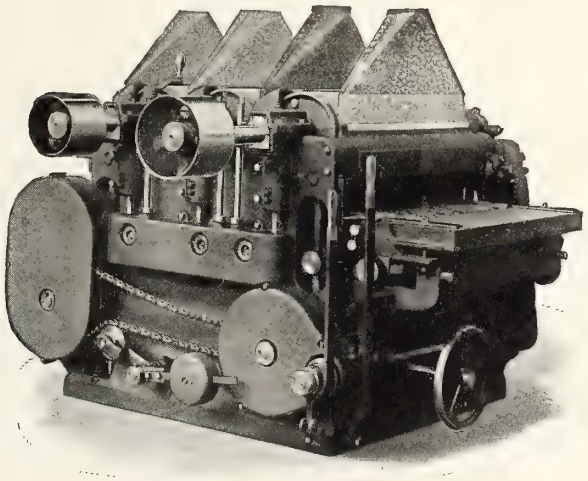
"The stuff don't measure up to standard, I know," says the operator, "but you can't get better service from the machine I've got. It's too worn to hold a good adjustment and hasn't half the capacity of the new modern machines"—

"Murray, over at Chapman's is running a

Berlin Endless-Bed Sander

and the finish he gets shines. He tells me he has a cinch hopper feeding all their short and medium stock in dozen lots—in a quarter the time and cost their old method took. Even his wide thin veneers and panels go through to a perfect finish, because the grit can't cut deeper in one place than another. He says the slight 'give' to the rubber faced bed always takes care of that." . . . . .

Will you give us the chance to prove Murray right?



Every inch of bed surface yields returns on your investment. Larger output is assured.

Adjustable to 1-1000 inch and absolute rigidity of construction provide lasting accuracy. Sanding quality is maintained.

BERLIN MACHINE WORKS, LIMITED, HAMILTON, ONT.

Largest Manufacturers of Wood-working Machinery in the World

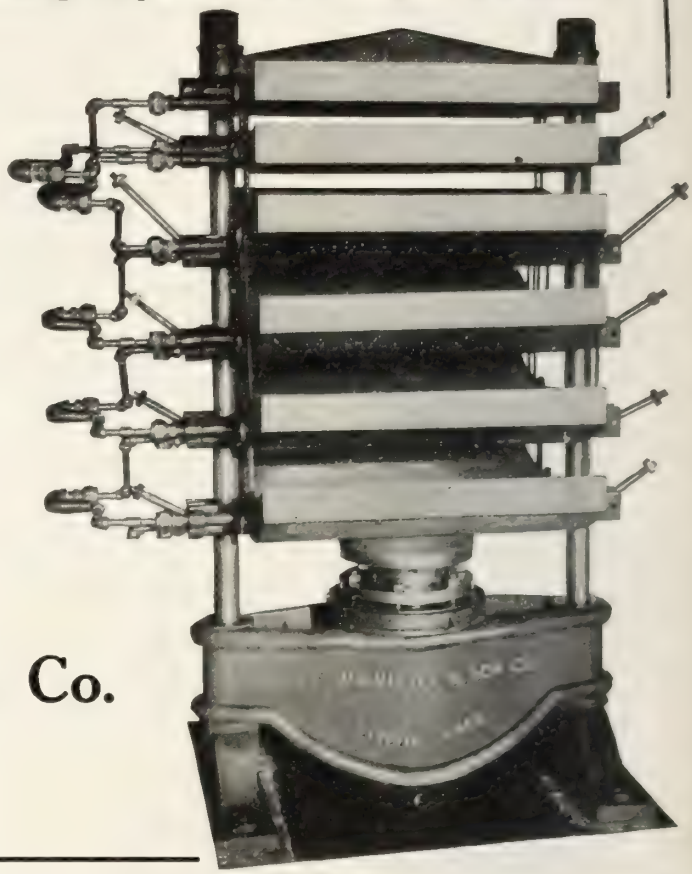
UNITED STATES PLANT (With Offices) - - BELOIT, WIS.

McKnight's No. 101, Five Opening Hydraulic Back Bender

THIS cut shows only one of the number of Benders we manufacture for bending different parts of chairs. We manufacture machines for bending backs, back posts, front legs, on either round or square post chairs, and rockers for same.

We also manufacture a complete line of Benders for handle factories, for round handles for pitchforks or shovel handles.

Prices and full particulars on our complete line of woodworking machinery given on application.



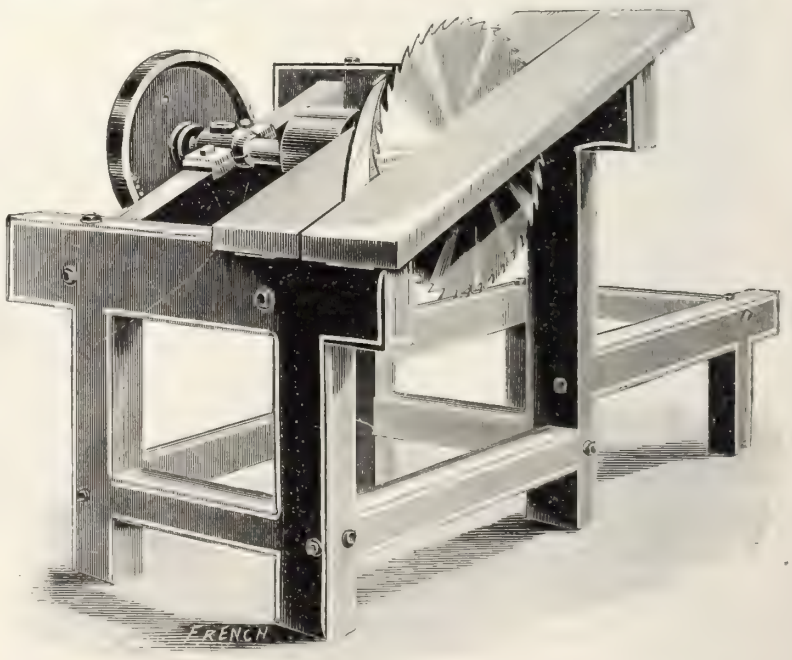
L. G. McKnight & Son Co.
Main Street
Gardner, Mass.

The Klotz Blocking Saw Machine
for Simplicity and Speed

The Klotz Hatchet Saw Machine is specially designed for cutting out shapes or blanks for handles or other kinds of work, from planks or slabs, after they are cut from the log. The table is on an incline, so that all waste pieces will slide off out of the way readily. It has a raised platform for the operator to stand on. The table is hung on hinges so that it can be lifted up conveniently to get at the bearings and the nut of the mandrel. The mandrel is of steel; the balance wheel is turned. The saw is from 22 to 26 inches in diameter, as required, according to the work to be done on the machine.

The pulley on mandrel is 8-inch diameter, 6½-inch face; should make 1,500 revolutions per minute with a 26-inch saw. Power required, 2 h.p. Shipping weight, 850 lbs. Floor space, 4 x 7 feet.

Write us for prices.



Klotz Machine Company, Sandusky, Ohio

Slow Speed Low Power Shaving and Dust Collecting Systems

New Systems designed. Old systems corrected.
Long distance blows a specialty.

Trained Mechanics. We know how.

Consult our Expert

INVINCIBLE BLOW PIPE CO.

CHICAGO 176 George St., TORONTO

Perkins Vegetable Glue

The Best for Built-up Stock and Veneer Laying

Dinner wagon manufactured by the D. Hibner Furniture Co., Limited, Berlin, Ont., in which Perkins Glue was used.

Perkins Vegetable Glue sticks and holds. It is unaffected by dampness, extremely dry atmosphere or severe sanding. We guarantee to effect a 20 per cent. saving in your glue room by replacing hide glue with Perkins Vegetable Glue. Along with this saving you can have a glue room comfortable as to temperature and sweet as to smell. The glue is absolutely uniform in quality. Every shipment exactly the same. Let us demonstrate in your own factory and on your own stock just what can be accomplished with Perkins Vegetable Glue.

Perkins Glue Company, South Bend, Ind.

Good Steel, Carefully Manufactured, Scientifically Tempered

Our **GLUE JOINT CUTTERS** Make a Perfect Joint.
MILLED SHAPER CUTTERS—Any Size or Any Shape. Ask for quotations.

GALT KNIFE COMPANY, LIMITED **99 State Street, Galt, Ontario**

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Wood Turning Machine Company ...

BOOKS FOR SALE

The following books are offered at special prices subject to previous sale:

Carpentry and Joinery, by Gilbert Townsend. Published in 1913 by the American School of Correspondence. 258 pages, illustrated. Price $1.00.

Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

The Book of Lumber Shed Construction, by Met. L. Saley. Published by American Lumberman, Chicago. 176 pages, illustrated. Price $1.00.

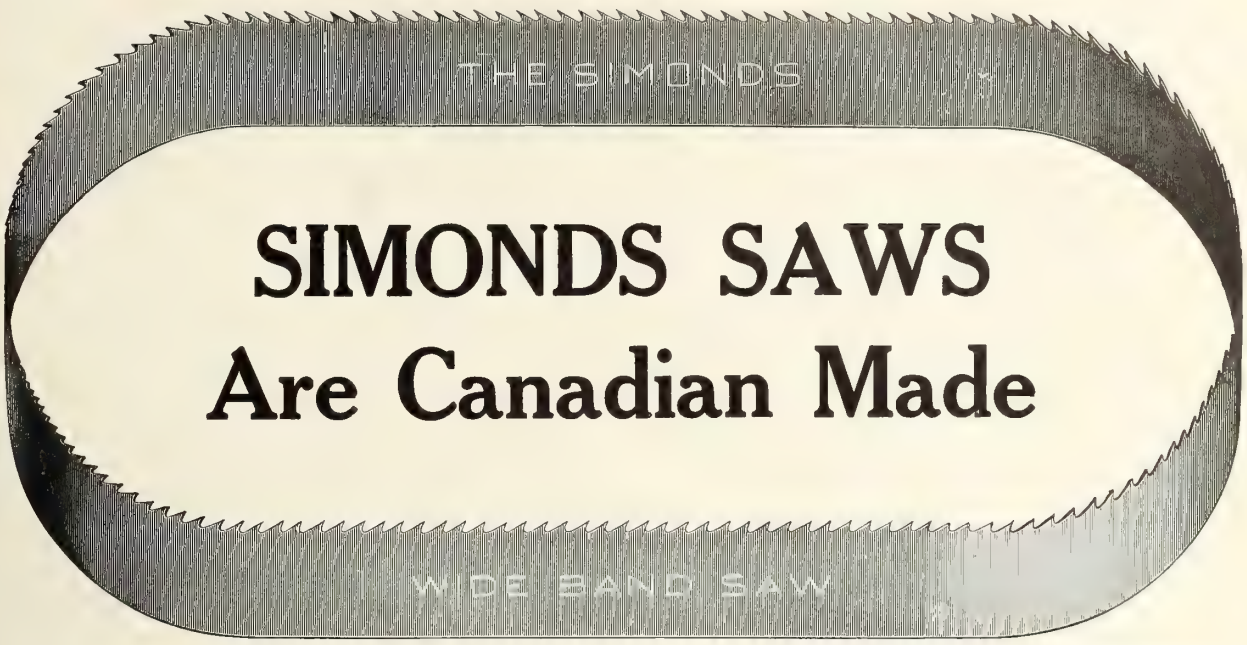
Popular Mechanics Shop Notes, Published by Popular Mechanics, Chicago. Easy Ways to do Hard Things, etc. Years 1905-1906-1907-1908. Price 40c. each.

Cabinet Making, by J. H. Rudd.. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

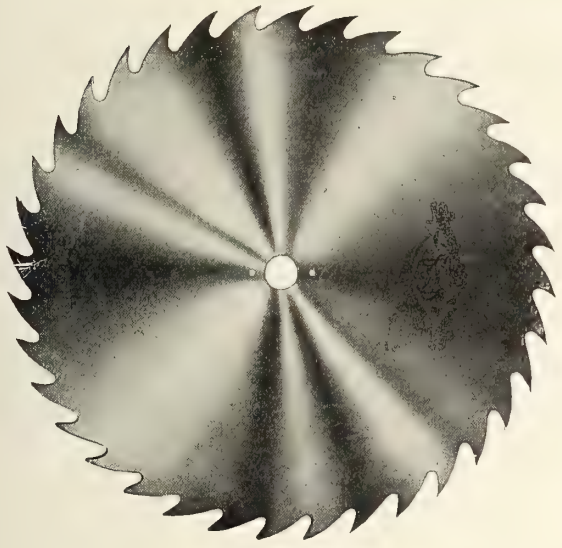
Guide & Assistant for Carpenters & Mechanics, by H. G. Richey, Published by William T. Comstock. 177 pages, illustrated. Price 50 cents.

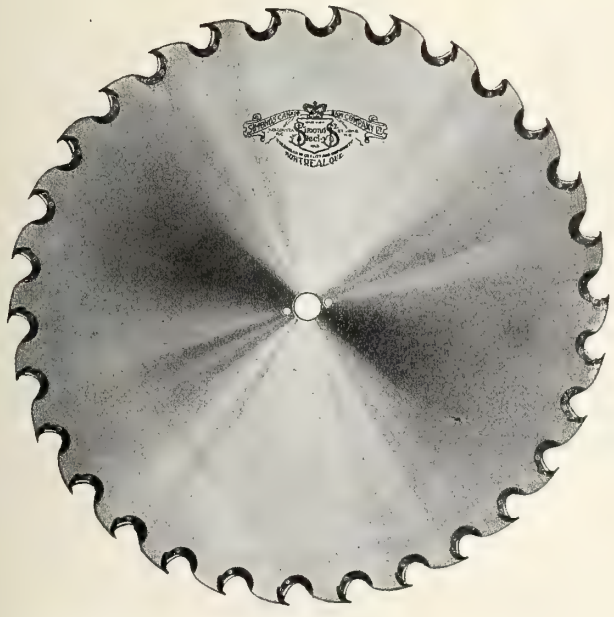
Woodworker Publishing Company, Limited

345 Adelaide Street West, Toronto, Ontario



SIMONDS SAWS
Are Canadian Made





Principal Factory in Montreal. Shops in St. John and Vancouver.

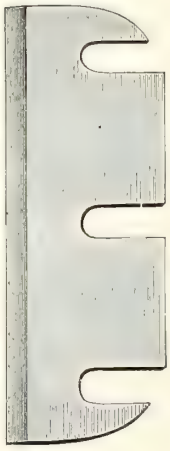
Just added to our Montreal plant a very large three-storey substantial brick building, almost doubling the plant's capacity.

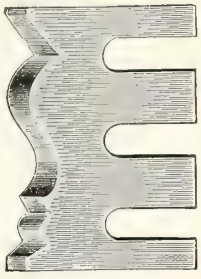
That's what we do for Canada.

These facts, together with our well-known reputation for furnishing highest quality goods entitle us to be called upon by you to supply your saws or woodworking machine knives of any size or description.

Our aim is to combine Canadian workmanship, high quality, honest prices and quick service.

Let us hear from you.





Simonds Canada Saw Co.
Limited
Montreal
Vancouver, B. C. St. John, N. B.

Chas. F. Luehrmann Hardwood Lumber Co.

148 Carroll Street

ST. LOUIS, MO.

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The Silver Lining

OPTIMIST and pessimist alike may learn a thing or two from the report issued recently by the Canadian Northern Railway. In it one finds considerable encouragement, especially when one considers it in conjunction with the recent disclosure of the fact that Canada's war orders to date total nearly four hundred million dollars.

In an effort to discover the actual status of trade in Canada, the railway company sought the opinions of more than two thousand representative men in all classes of enterprise throughout the country. On the whole, the reports indicate that the period of greatest depression has actually passed: less than ten per cent. of those who have contributed their views to this survey of trade conditions confess to a gloomy outlook. With regard to the probable state of trade after the restoration of peace, the general idea seems to be that conditions will return rapidly to the normal.

Taking the Dominion as a whole, business is shown to be from fifteen to twenty per cent. below the average of last year. Trade in the Maritime Provinces is affected less; while in the West it is far below normal. In Quebec and Ontario business is slow, but shows signs of improvement. The agricultural districts appear to be holding their own: collections in such centres are as good as usual, and activities have not been curtailed to any extent. The chief falling off of trade has been in the large industrial centres.

There is evidence of a disposition to rely upon the crops of 1915, and to qualify expressions of optimism with the remark that the crops will be the determining factor. From late reports dealing directly with crop conditions it seems pretty certain that if the determination of the state of Canada's trade remains with the grain crops here is little cause for anxiety. With the incentive of prevailing high prices the farmers have devoted more time and care to cultivation; they have used better seed, and have increased their acreage of wheat, and Canada's grain crop of 1915 will show the usual annual increase.

The partial collapse of the building trades has been the cause of a substantial reduction in the volume of sales of Canadian lumber; but the export trade in lumber has stood up well, and the chief difficulty seems to be in connection with the availability of ships to carry lumber cargoes.

The leather goods industries are in an abnormally flourishing state. There is a great demand for leather manufactures for the armies of the Allies. Prices have advanced considerably in all lines, the increase being due to the scarcity of raw materials caused by the demands of the military upon the available supplies. A large section of the textile industry is also affected by the military orders, but where these orders are not in evidence trade is somewhat less in volume than it was a year ago. Supplies of raw material from Great Britain have become difficult to secure, even at advanced prices, and it is expected that a scarcity will prevail for the remainder of the year.

The publication of this report has done much to give a better understanding of the effect of the war on Canadian trade.

War Orders

THERE is only one way to get business in such times as these, and that is to get after it. The war is bringing its share of business to the woodworking industry; but contracts are like cheques—they seldom walk in unsolicited. As a single instance of the manner in which business is to be had, we might cite the experience of Alderman Matthews, of the Matthews Sash Company, Fort William, who took the comparatively long trip to Ottawa with his mind made up to get a contract for shell boxes. When he first arrived at the Federal Capital he was told that there was nothing doing. But he was not discouraged. He looked wise, kept his own counsel, and stayed right on the job until he landed an order worth $25,000. Not an avalanche of business, but something worth while at a time when every order counts so much for the plant and for the men employed in it.

Adaptability is looming up large as a factor in business just now. There are profitable orders to be had from the Government, but the work must measure up to standard, and in many cases the plant and machinery must be overhauled to meet requirements. Is it worth while?

* * *

In speaking of new business one must not imagine for a moment that activity is confined exclusively to the manufacture of shell cases, and so on. Occasionally reports come to hand which leave one optimistic—and almost cheerful. Take, for instance, the case of the B. C. Manufacturing Company, of Queensborough.

This plant, we are told, is working day and night, and installing additional machinery in order to cope with the business on hand. This activity is due largely to the early berry season, but it is significant to find that the B. C. company is supplying all the fruit veneer baskets used in British Columbia—a business which was formerly in the hands of United States manufacturers. Apart from this, the firm has been filling large shipments for Australia.

The Need for Industrial Education

Specially contributed by William G. Colgate, Toronto.

"If we are to secure and hold our share of trade we must develop through the services of our own people the highest types of industries, which should be the natural growth of our resources. To this end our youth must be trained in invention, in design, and in specialized knowledge for technical as well as for executive positions."—From the recent report of Dr. F. W. Merchant, Director of Industrial and Technical Education for the Province of Ontario.

INDUSTRIAL management has no greater problem than the lack of trained men. To the lack of properly trained workmen, indeed, may be laid the blame for most of our industrial troubles, of which wasted time, energy, and material are the most common. Less obvious, perhaps, but of even greater importance, are the evils of restricted output, excessive overhead charges, and the continual and expensive breaking in of new men to fill gaps caused by discontentment or incompetency. Naturally there has developed from these conditions a scarcity of men suitable for the higher and more responsible positions, in which tact, technical skill, executive ability, and general proficiency are required. Sufficient reason therefore is furnished for the belief now prevalent that the establishment of a system of technical schools is not only desirable, but imperative, if the moral, physical, and material resources of our nation are to be conserved effectually.

First of all, it may well be asked why our workmen in many instances seem so poorly fitted for the places they occupy. Why are there so many lawyers who would be better as machinists, and so many machinists who would be better as farmers, and so many farmers who would be better as bankers—so many round pegs trying to fit themselves into square holes, and becoming exceedingly uncomfortable in the process? Many answers might be given in reply to this very natural question. There are, however, two principal ones—namely, lack of interest on the part of parents and teachers in the boy's future, and a common school system that falls far short of our necessities.

When a boy leaves school and starts to work his future receives little thought from teacher or parents. Questions as to whether he is fitted mentally, morally, or physically for the job in view, whether he will be happy in it, or whether it assures him a decent living when he has mastered it, are dismissed as inconsequential, if they are considered at all. The immediate thought is the job and its present salary. Consequently, no written promise is exacted by the parents to safeguard the boy from exploitation by the employer and to ensure that he shall be taught the rudiments of a trade. Ignorant of what he is going to do, or why, the boy starts in his new position. He meets men older than himself, and comes under their influence; he adopts their ideas, their modes of speech, their actions, and their manners. Lacking the saving incentive to work that a definite objective would give, he soon falls into habits of shiftlessness and idleness.

Our common schools, on the other hand, cannot be said to do any more for the boy than his parents. As a matter of fact, we have no real common schools. Our system of public schools is for the professional classes. The most it does is to prepare the way for the intermediate schools or for petty office jobs. It turns the boy out at fourteen to shift for himself, and deprives him of State aid at a time when State aid is required most urgently. He secures a job—a boy's job. Frequently he cannot take a boy's job that leads to a man's job; he takes a boy's job that leads to a "half-way" position, where he becomes a clerk or driver or general odd-job man. He joins the vast army of unskilled labor, or else pursues a regular vocation for which he has little liking and less ability. How much better the school would serve its purpose to the State and to the individual were it to turn out boys fitted to succeed in any recognized trade or calling in which they could become bread-winners and useful, self-respecting citizens. For, after all, our democracy cannot rise higher than the level of its individual units; and, if we are content to accept a low average of intelligence and proficiency in our industries, then we must perforce be content to accept a similar low state of nationhood. It is as useless to expect one result without the other as to expect water to run up a hill, or to look for July weather in January. To lay stress upon such an obvious and inevitable effect may seem trite to the common-sense mind—yet the great number of people who ignore or overlook this phase of the question would seem to make some reference to it necessary.

The failure of our elementary schools to supply a well-considered system of training for boys in trades is sufficient evidence of a need for industrial or technical instruction which shall assume the performance of this duty. Instead, therefore, of leaving the boy to shift for himself when he leaves school at the age of fourteen, the vocational school should be ready to receive him. In fact, the vocational school should occupy the same relation to the boy who is designed to follow a trade as the high school is intended to do for the boy who is preparing for a profession. In arranging a technical course it should be planned to consist of at least two years' vocational instruction in whatever branch of trade the boy may elect to pursue. Daily instruction of from four to six hours' duration would be given by practical men and educators, who would also be appointed to the administration of the school—the practical men, in order that the pupils may be kept in touch with actual life outside—the educators, to plan and systematize the work of instruction.

In thus outlining roughly the scope of the industrial school, there is no intention, expressed or implied, to supersede cultural by vocational instruction. On the contrary, it will be readily recognized that the best results are likely to be obtained when both are combined in one sound plan of education; for it will be plain to all that both branches of learning are essential if the boy is to receive a thorough and well-balanced education. In connection with the vocational schools, however, technical instruction should rightly predominate, with cultural subjects arranged as a supplementary course to which pupils may be assigend as their individual needs may prescribe.

At present the Government spends ten million dol-

lars on agricultural education. No one who is at all acquainted with the scope and purpose of this instruction will feel inclined to dispute the wisdom of the expenditure, large as it may seem. Still, the point may well be raised that if a pursuit, which, while relatively important, nevertheless represents but one of our numerous industries, is entitled to so much financial support, surely our manufactures, in which are represented more money and a greater volume of profit, are justified in seeking proportionate consideration. In strict justice to all, the Government cannot well do less. Since it would be idle to decry the value of vocational instruction to the farmer, it would be equally absurd to argue that technical education is even less indispensable to the man at the lathe or the bench. Rather is such training more essential to the proficiency of the mechanic than to the agriculturist, since the former rarely receives the benefit of intuitive knowledge which does much to lighten the work of the farmer.

It is encouraging to turn from a contemplation of the causes of our industrial inefficiency to the practical, constructive efforts that are now being made to remove these causes. For, if current reports are true, the nation is awaking at last to a proper sense of its responsibility to those of our citizens whom it has hitherto consistently neglected. According to a recent press report, the Government—stimulated possibly by the success of Toronto's move in technical education—has opened classes for technical instruction throughout the province of Ontario. Nor has the establishment of these classes been confined, as one might suppose, to the larger centres of population; on the contrary, new schools have been opened in such comparatively small places as Goderich, Oakville, Oshawa, Port Credit, and Woodstock. Additional classes have been added to schools in Berlin, Brantford, Collingwood, Fort William, Galt, Guelph, Hamilton, Ingersoll, Kingston, London, Ottawa, Owen Sound, Pembroke, St. Thomas, and Toronto. In all, thirty-five towns and cities have evening classes, but no day classes. It is to be hoped, therefore, that the Government, having proved the practical value of the evening classes, may yet be induced to consider the opening of vocational day schools to augment the good work which is now being done by the night classes. The fact that there are 200,000 boys employed at various kinds of labor in Canada who have no technical knowledge whatever shows how urgent is the need for such instruction.

Rare Examples of Adam Furniture*

By James Thomson

HERE is a veritable patrician amongst the styles—chaste, refined, and the possessor of character and distinction. An Adam dwelling is in fact but expression in the concrete of inward feeling refined, artistic, and intellectual. Even in its hour of dilapidation, decadence and neglect, there is an air of gentility about it. The Adam style, therefore, whether in architecture or furnishings, is one for the few rather than for the many. The appreciation of it implies some measure of cultivated feeling.

The product of a mind classically trained, of an eye sensitive to beauty of line and mass, of excellent judgment in the field of decorative endeavor, in the Adam style we have a most successful adaptation of ancient classic form to modern needs. It found favor with the cultivated Englishman of the latter half of the eighteenth century, as it also did with our own Colonials. The New England builders of the last quarter of the eighteenth century and the first decade of the next were influenced in a large degree in their operations by the publication in 1778 of the Adam work on architecture. The fine old dwellings—of which fortunately many still remain to us—in Salem and Boston most admirably reflect the Adam taste. For this reason Chestnut Street in Salem, and the Beacon Hill district of Boston, are in aspect essentially English.

It is not, however, my present purpose to consider the purely architectural side of the style. The bro-

*This article is one of a series of four which are being reproduced in The Canadian Woodworker and Furniture Manufacturer by the kind co-operation of The Craftsman of New York City. The first article, published in our February issue, was devoted to the Chippendale style; the second, in our June issue, to the Heppelwhite style. The series will be brought to a close by an article on the Sheraton style, which will appear in either the August or the September issue.

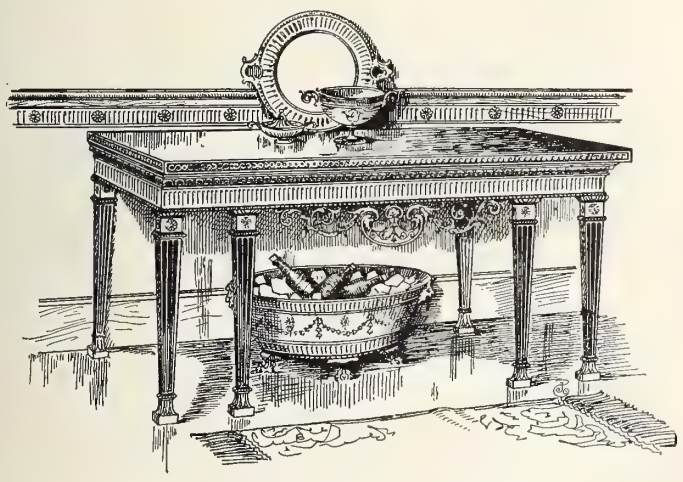


Fig. 1.—A sideboard table in pure Adam design.

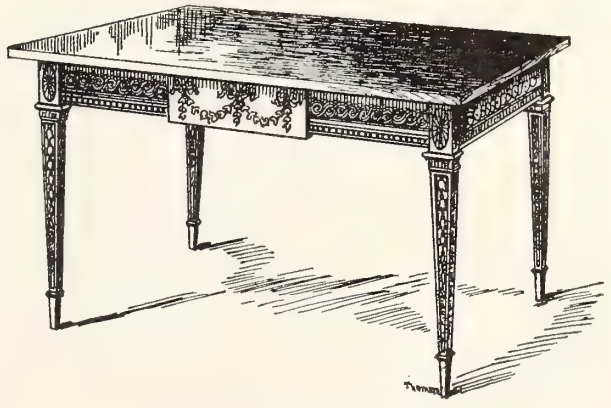


Fig. 2.—Adam centre table.

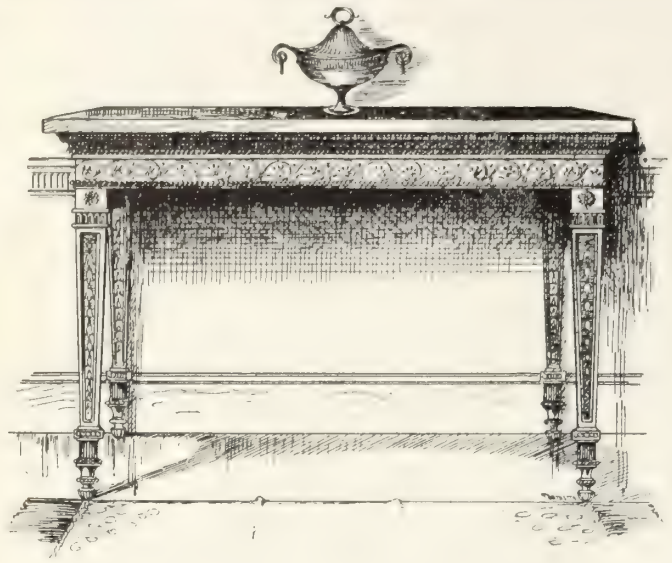


Fig. 3.--A second example of the beautiful sideboard table.

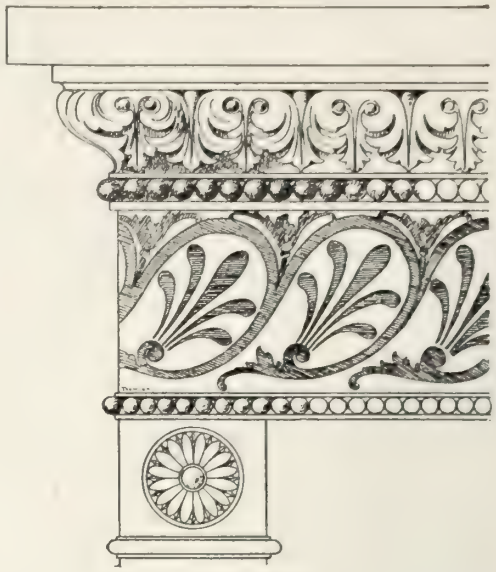


Fig. 4.—Enlarged detail of Adam design on the table in Fig. 3.

thers Adam, while distinguished architects and best known in that capacity, also designed carriages, sedan chairs, balustrades, ceilings, plate, firegrates, and furniture, and usually succeeded in beautifying everything they touched. As they published a book of designs in 1778 and reprints are now to be had, the character of the furniture for which they were responsible is easily established. The sketches which illustrate this article, however, were made from a private collection of prints from copperplate some quarter of a century old.

Robert Adam was the second of the four sons of William Adam, and was born in Kirkcaldy, Scotland, in 1728. He came of a family of excellent social standing and condition. Early exhibiting a marked talent for drawing, and deciding to be an architect, he went to Italy and France in order to get a full grounding in the classic orders. At the expiration of four years, with a full note-book, he returned to his native land and formed a partnership with his brother James. The names of Robert and James are usually coupled in published works; it is generally understood, however, that the quartette of brothers were in partnership, though perhaps not all draughtsmen or designers.

The Adam architectural influence was destined to be wide-spread and important. Among noted buildings that at present stand to the credit of the talented Scots is the Adelphi in London, which was built in the year 1768. It consists of the Terrace overlooking the river and neighboring streets, the names of which are respectively John, James, Robert, William, and Adam. Thus is the family name and those of the four brothers perpetuated.

To be adequately viewed, and appreciated at its true worth, the Terrace must be taken in from the Embankment, or, better still, by a boat trip on the river. The haunting beauty of the Adam ceilings and mantelpieces has been testified to by many. They can of course only be judged correctly by a survey of the noted interiors, which should not be difficult, considering that the buildings, many of them, are now devoted to business purposes.

While the Terrace has fallen somewhat from its ancient estate, there are still many distinguished people domiciled there, among the number being James M. Barrie, George Bernard Shaw, John Galsworthy, and Granville Barker.

Coming down to a consideration of the Adam examples which I herein have the pleasure of submitting, I would remark that the nearest the Adam brothers came to a sideboard is shown in our illustration the "Sideboard Table." In the centre space, resting upon

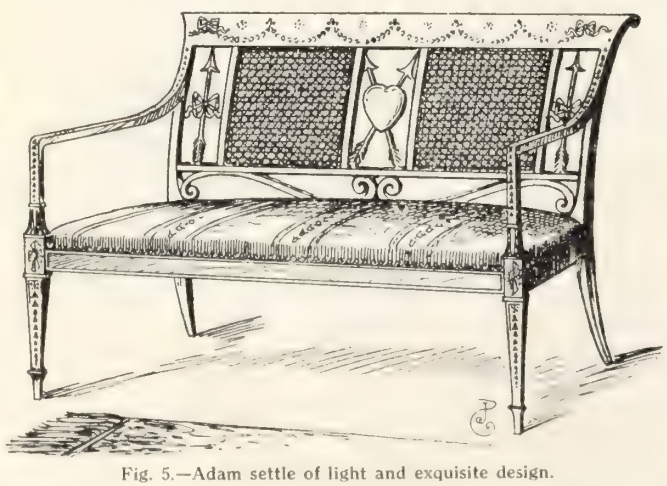


Fig. 5.—Adam settle of light and exquisite design.

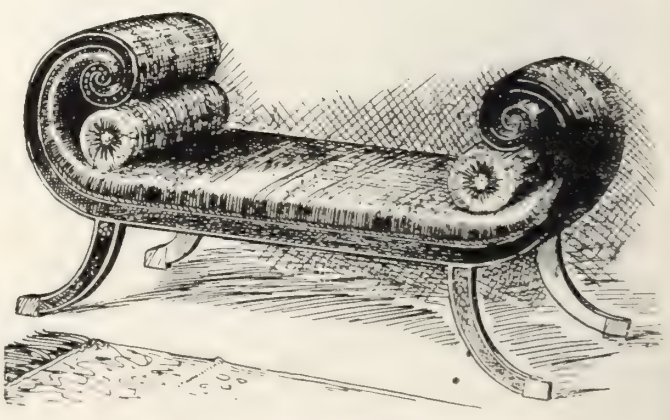


Fig. 6.—Adam seat, showing Empire influence.

the floor, was sometimes placed the cellarette, in which, while diners were in action, were kept the wines. In designs of sideboards by Chippendale, Heppelwhite, and Sheraton the cellarette is in evidence.

In regard to the sideboard as a piece of dining-room furniture, there are several in the South Kensington Museum that may pass for such, being catalogued under the name of dressoir or dressoir de salle a manger. They are small cupboards, and would be called cabinets but for the drawers half way down and the rows of shelves at the top. In the Middle Ages the dressers were but covered boards or shelves against a wall on which plate was set, and were made in three or more stages, according to the splendor of the occasion. The cupboarded dresser of more modest pretentions was considered a piece of dining-room furniture. It was ordinarily covered with a piece of embroidery.

In this year of grace, in the face of these easily ascertainable historical facts, our western furniture makers have transferred the name "dresser" to the ordinary American bureau with looking-glass attachment.

Fig. 3 shows another beautiful and characteritsic specimen of the style. In the arrangement of parts it would be difficult to improve on it. The legs are

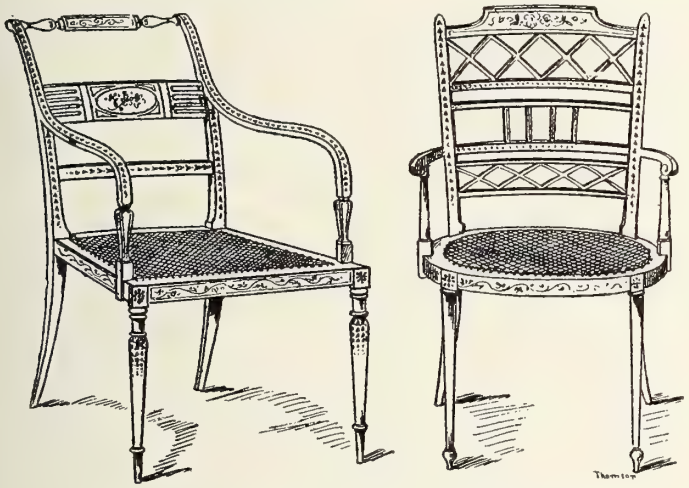


Fig. 7.—Chairs in the Adam style, with painted decoration.

especially graceful, full of variety, and altogether well thought out. "Repetition with variety" is the motto the Adam brothers ever kept in the foreground.

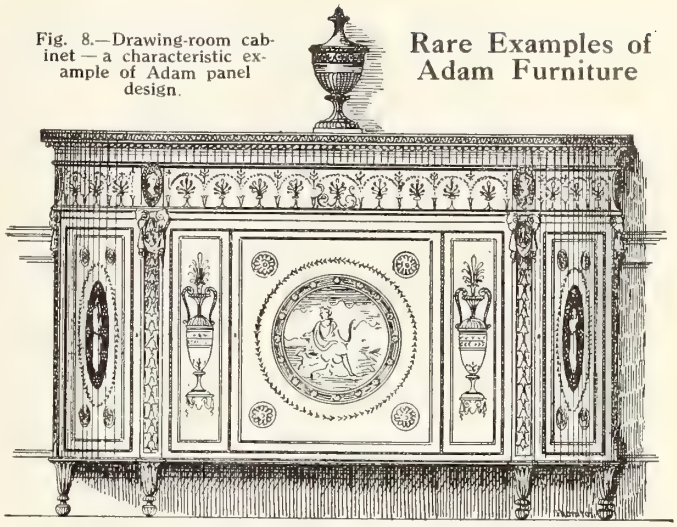
To exemplify more fully the beauty of the Adam ornament, I have in Fig. 4 submitted an enlarged drawing of a section of the frame-work of this table. The honeysuckle ornament is intended to be an inlay of wood, which may be either lighter or darker than the ground.

Seats (and sofas of the kind with backs) after the manner of the one shown in Fig. 6 were designed by the Adam brothers, but in the Empire style are also to be found seats with similar scroll arms. This is not to be wondered at when we consider that the basis in both instances was classically the same. Empire seats, however, were beautifully embellished with ormolu mounts. In the present instance the only brass is in the terminals or toes of legs. The woods used are mahogany and satinwood.

Adam chairs and sofas were in general light and graceful but nevertheless substantial, the material mahogany or satinwood, the ornament inlaid, and perhaps a little carving. When painted, lacquered or gilded, birch or cherry was employed. Painted or enamelled chairs were embellished by ornament done in oils by the most celebrated artists of the day. Painted

Rare Examples of Adam Furniture

Fig. 8.—Drawing-room cabinet — a characteristic example of Adam panel design.



decoration after the Greek manner, depending on outline for effect, is to be commended for this class of work. There is little beauty in some decoration to be found on Adam chairs where the work is treated in a broad manner, the colors being jumbled and the outlines scarcely noticeable.

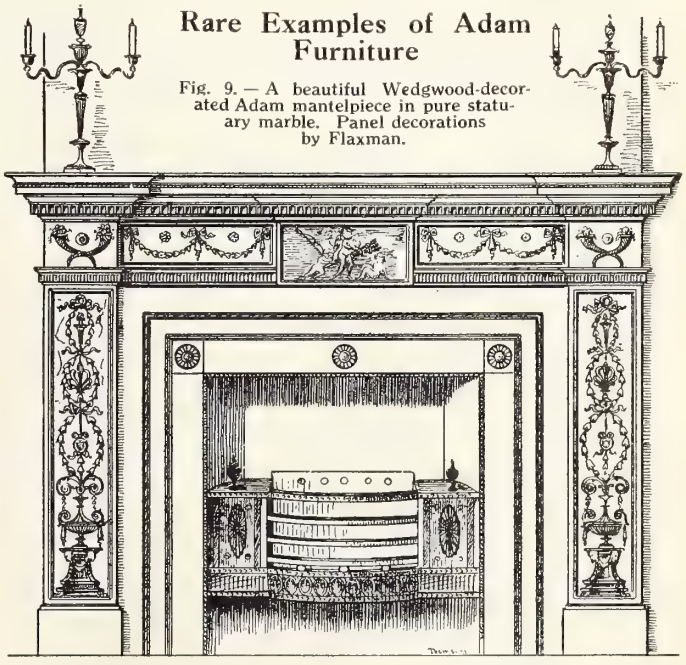
In Fig. 7 are two exceedingly graceful but substantial examples in the designers' daintiest mood.* Cane was employed quite extensively, not only for seats and backs of chairs and sofas, but for decorative purpose also. Panels of intricate design are to be found done in cane in Adam casework.

A very beautiful and characteristic example in the form of a drawing-room cabinet is submitted in Fig. 8. It would be difficult for the most accomplished modern designer to improve on this. Admirably spaced and proportioned, the distribution of ornament leaves nothing to be desired. Even in the hands of the most skilled, the pen is a clumsy instrument compared with the tool of the copperplate engraver, hence at best the drawing renders but inadequately the spirit of the original.

No article on this subject would be complete without some reference to the Adam mantelpieces, of which the talented brothers are credited with a large num-

Rare Examples of Adam Furniture

Fig. 9. — A beautiful Wedgwood-decorated Adam mantelpiece in pure statuary marble. Panel decorations by Flaxman.



ber. It was their custom to design the firegrates also, and many fine examples in that line are to be found to-day. From the art point of view these steel grates are far above the ordinary effort in that direction.

In Fig. 9 is shown a very beautiful example in

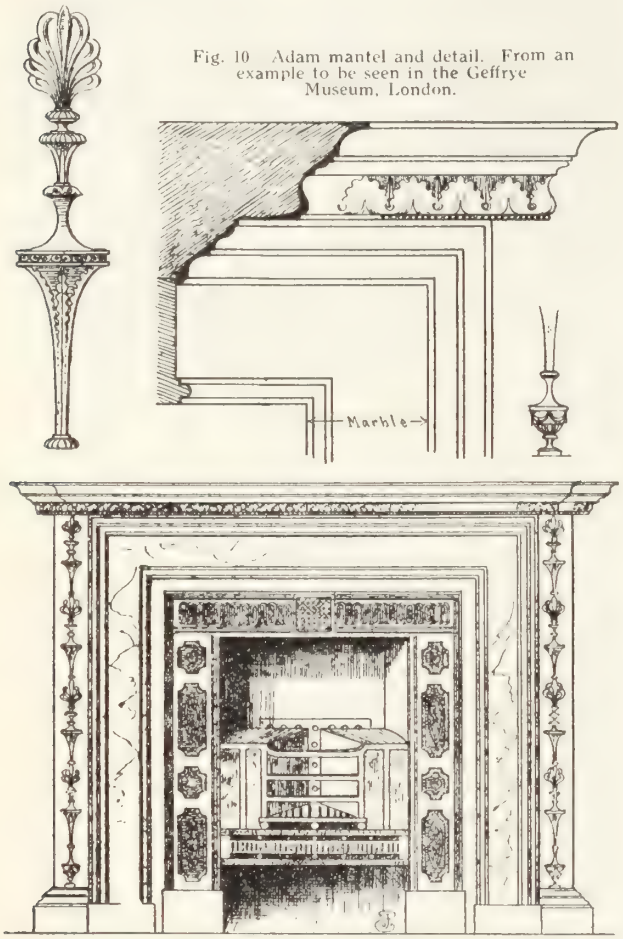


Fig. 10 Adam mantel and detail. From an example to be seen in the Geffrye Museum, London.

statuary marble. The drawing, made from a photograph, cannot of course convey any impression of the beauty of modelling in the Flaxman plaques. Some idea may be gained of the qualities of such work by

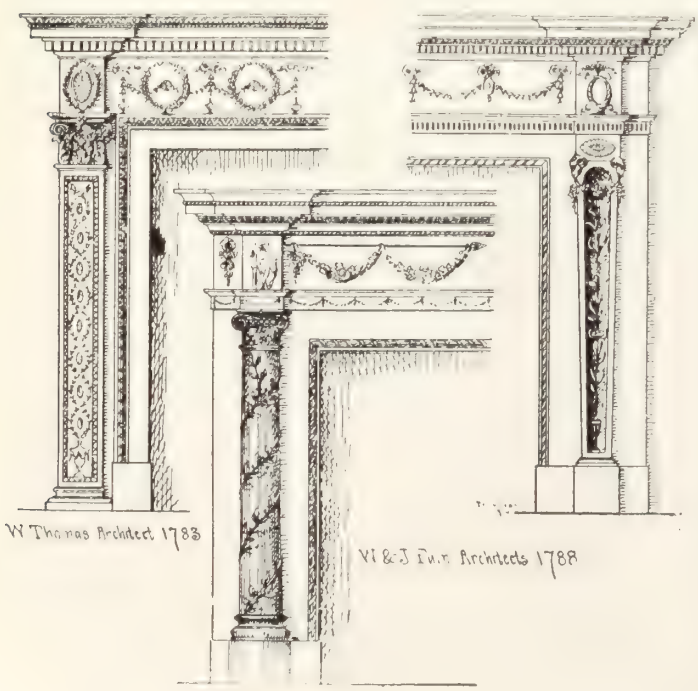


Fig. 11.—Details in designs of mantels of this period.

an examination of the decorations of Wedgewood ware.

Fig. 10 exhibits another Adam mantel of greater simplicity but of equal merit. The original is in the Geffrye Museum, London.

To Robert and James Adam is no doubt credited much that is fine which in all fairness should be assigned to others. In Fig. 11 are shown specimens of the product of eminent architects contemporary with the brothers. Without a doubt such designs would, in nine cases out of ten, be credited to the latter. Nor could the work be bettered much by any one. The example of the designing skill of W. Thomas is particularly pleasing. To improve on it would be difficult.

Mantels, too, of an earlier period, save for a certain flamboyance in ornament, might pass for Adam products. The early Georgian work made use of the "five orders," but engrafted upon it was ornament of a naturalistic order. Early Colonial examples in this country are of this "Free Classic" order, and are just as beautiful and desirable as the product of Adam. Robert Kent (1685 to 1748) has left designs of some fine mantels. His outlines are as severely classical as are those of Adam, but the carving is of the school of Grinling Gibbons.

Adam furniture has been little known in this country, which may be ascribed to the fact that the brothers worked for a clientele essentially aristocratic. Made for the nobles and gentry, it became a fixture in the homes of the great until the breaking up of collections made it known to the public. A survey in the shops of antique dealers disclosed but very little furniture of the Adam stamp.

How little indeed was Adam furniture regarded may be judged from the fact that in "Art Decoration Applied to Furniture," a book published by the Harpers in 1877, the author being Harriet Prescott Spofford, there is no mention of it. "After exhausting the resources of the Congressional Library in the preparation of this book" the distinguished author devotes but a single paragraph to a description of a looking-glass which after all seems to have been the work of another but equally skilled hand. From the naturalistic style of the carving, the frame obviously was not the work of the Adam brothers. B. Pastorini and Pergolisi, contemporaries of Adam, were responsible for a lot of fine work of this character. The latter in 1777 published a book of designs of ceilings, looking-glasses, sconces, etc., which are characterized by felicity of line and airy grace. The fact is, that many talented compeers of Adam have been lost sight of in the shadows of a greater name. Everything of English eighteenth-century production that resembles the work of the Adam brothers has been forthwith assigned to them.

Our cabinet-makers are to-day turning to the Adam style for inspiration. The charming centre table shown in Fig. 2, when shorn of the elaborate running ornament around the frame, would come nearest of the submitted illustrations to the Adam furniture as at present offered in the American market.

Robert Adam has been acclaimed a genius. He was at least a most skilled adapter. Out of complex materials of a bygone age he erected a fabric that was new. Many another has attempted to do as much and failed. It is not given to all designers to know what to avoid. Robert Adam had the capacity to choose wisely. Delicacy and restraint are always in evidence in his work. It is the same qualities that supply the charm in our Colonial style. Once we begin to add ornament of a flamboyant kind the charm vanishes.

The Furniture Factory Machine Room

THE machine room of the furniture or cabinet factory is looked upon as the most important part of the mechanical end of the plant, and there is a great deal of reason for this view, writes Edgar Arnold in The Wood-Worker. "A stream cannot rise higher than its source," is not more true anywhere than here. The machine room of the furniture factory is the spot from whence rises the stream of goods that winds its way through the various other departments, increasing in value as it flows on, until it reaches the shipper's door and is loaded on the cars for distribution throughout the country.

The efficiency of the various departments through which this stream must flow will of necessity be affected by the efficiency of the machine room. If this department goes wrong, if it neglects to get out certain parts for any particular batch of goods, the effect is felt throughout the whole plant. The mistake is not detected until the cabinet-makers take the job over and begin work; then there is a wait. The delay in the cabinet department is felt in the finishing room, and so on to the shipping room.

But the machine room is not always to blame when these delays take place. Here, as elsewhere, there is such a thing as "a man higher up." Very often the superintendent or the man who makes out the stock bills does his work imperfectly, and the result is the machine room becomes disorganized. In a plant manufacturing such a varied line of goods as is found in most furniture factories, too much attention cannot be given to details in the way of starting everything off right. If the stock bill is wrong in any particular the cutting-out department will go wrong, then every other machine in the whole room suffers in consequence.

Some one has said that a stone cast into the depths of the sea disturbs the whole volume of water, even to the farthest shore. The mistake of one man, though trivial in itself, if made in the early stages of the manufacturing process, will spread and make itself felt in every department of the shop. It is very important, therefore, that every factory have some one whose business it is to see that these mistakes do not occur.

For these reasons I would change entirely the method of managing the mechanical end of the business that prevails in so many factories. In almost all of them the superintendent, in addition to exercising a general supervision over the whole plant, has certain specific duties to perform. These duties are, as a rule, connected with the early stages of the manufacturing process. In many factories the superintendent is connected with the machine room, does the draughting, and makes out the stock bills. These things call for good men, but they do not call for the superintendent to do them.

The qualities of a draughtsman and those of a good superintendent are not of necessity the same. And if the superintendent, while acting as a draughtsman, makes a mistake, or if, while performing the duties of foreman of the machine room, he blunders, who is there to trip him up and set him right? No one. These blunders may go on for months, and sometimes years, and the true source of the trouble never be found out.

The specific duties of a superintendent—that is, those duties apart from the general supervision, should be as near to the shipping room door as possible. Instead of the superintendent's work passing through every other man's hands, every other man's work should pass under the superintendent's eye. He is then in a position to detect mistakes and trace them to their source, even back to the draughtsman. If the superintendent is the draughtsman the mistake is launched with small chances of being interrupted or responsibility placed where it belongs.

Every man in the machine room should receive his orders in writing, and these orders should contain all the information he will require to enable him to properly perform the work called for. If the man in the cutting-out department receives an order for one hundred dressers of a certain style, the order should contain the number of the stock bill, a record of these stock bills always being kept in the office. The sizes given on the stock bill should be the finished size, and the stock-cutter should allow the usual amount of trimming. It is important that the measurements given on the stock bills and the drafts be exactly correct.

Recently I saw a man at the trim saw, building a sideboard. He said he could not depend on the figures of the stock bill, and had to build the article as he went along, to make sure that he was right. The superintendent of this factory made the drafts and prepared the stock bills. Such a condition could not survive a day if the superintendent was located at the other end of the manufacturing line. A superintendent located at the output end of the manufacturing process is not likely to do any harm, even if he cannot do any good. If he does not understand the business himself, he will see that the other men do, because it is very important that the work comes to him in good condition.

Routing the work through the machine room in such a way that it moves from one place to another with the least possible handling requires considerable ability, but the ability to do so is necessary to success. Many machine rooms fall down because the men spend too much time pushing stuff out of their way. The machines should, as far as possible, be so arranged that when the lumber enters the room from the dry kiln it will keep moving from each machine toward the one where it is next required.

When a man fills up a truck and pushes it out of his way, that push should take it toward the machine and man who is to work on it next. In a great many shops no care is taken in this respect. The men push the trucks away without any thought of where the stock is wanted next; to get it out of their own way is their only thought. Very often the result of this thoughtlessness is that when a man wants to work on a certain truckload of stock he finds it surrounded by a lot of other trucks and considerable time is lost in getting it out.

Every factory should have a good supply of trucks. There are factories today that lose more time in one year through the men running around unloading and chasing up trucks, than would pay for a full complement of trucks for the factory. A truck should never have to be unloaded until it is done in the ordinary course of operations, and then it should at once be returned to a convenient place in the machine room.

Attention to small details is what counts for success. Some people wonder at the success that has attended certain factories, and imagine there is some

big secret behind it all. But there is not. A chain is not stronger than its weakest link. Every link or detail in the great chain of operations, from the lumber yard to the shipping room, must be carefully looked after, if, in this day of keen competition, a furniture factory is to be the success it might and ought to be.

Specifications for Shell Boxes

THE Shell Committee of the Dominion Government will require thousands of boxes in which to ship to England the great quantity of shells being made in over 200 factories throughout Canada. These boxes are each to hold two 4.5-inch howitzer shells. The boxes are to be well made, according to the following specifications.

Box Projectile.—Wood without tin lining, to hold two plugged shells.

Shell Q. F. high explosive 4.5 inch howitzer Mark V L .

Specification to govern manufacture and inspection.

General.—The box must conform in all particulars with drawing S.C.-C38, the sealed pattern and this specification. Should any discrepancy be found to exist between the drawing, pattern and this specification, reference is to be made to the Chief Inspector.

1. **Lumber.**—All lumber to be manufactured from sound stock and to be of even thickness the entire length. To be thoroughly seasoned or dried, free from sap, black or unsound material and loose knots. One end only may be allowed to be split, this split not exceeding 6 inches. No knot is to exceed 2 inches in diameter.

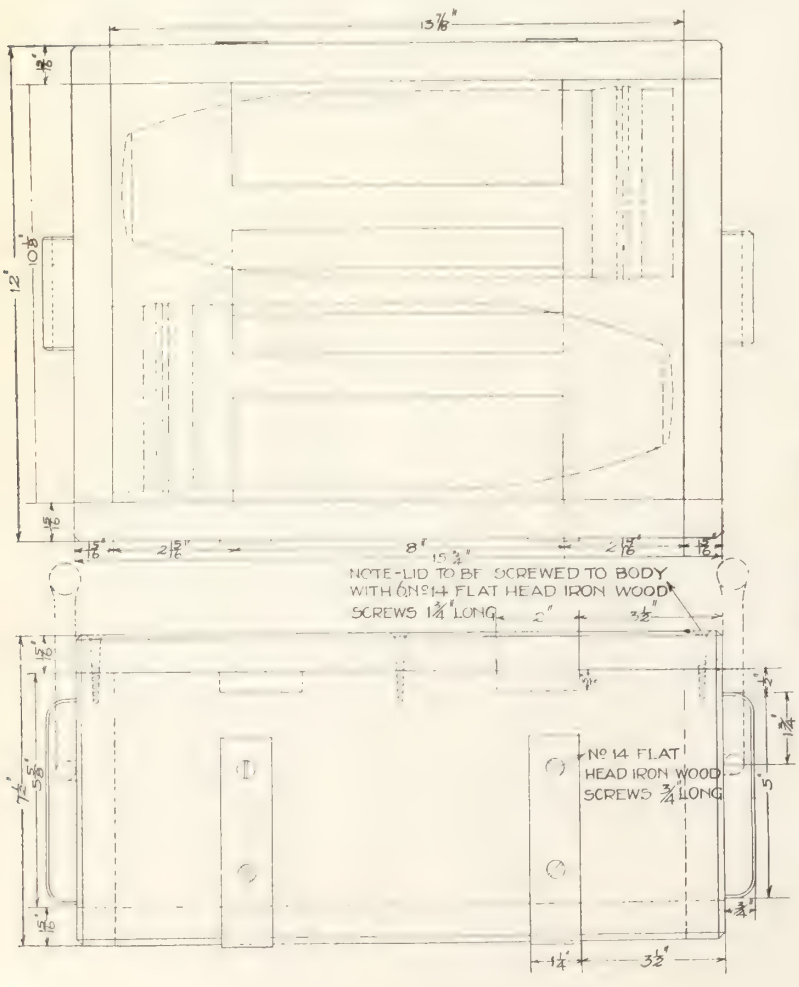
These boards should be firm, strong, serviceable, without waste, and dressed. By thoroughly seasoned, as here used, is meant a seasoning or drying, either in the open air, or in a kiln or in both, uniformly throughout the entire sections of size delivered, the average percentage of moisture contained in the lumber when delivered not exceeding 10 per cent. of its weight, as determined by the actual experiment.

2. (a) **Body.**—The body to be made of spruce, except the ends and handle cleats, which are to be made of hardwood, birch or maple. The lid and bottom may have one joint in each, which must be grooved, cross-tongued and glued. The sides, ends and bottom to be well nailed together with 2½-in. wire nails. The boards may be dressed to an even thickness of 15/16 in., the sides are to be further secured to the bottom by sheet iron bands held by iron screws.

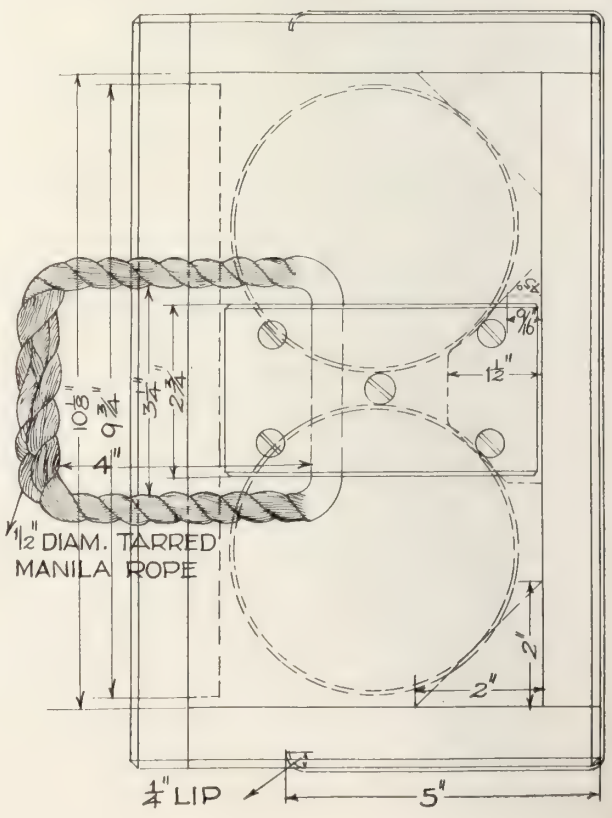
(b) **Lid.**—The lid is to be provided on the inside with battens of spruce, to be secured with 1¼-in. wire nails, also drilled with six countersunk holes for screws, 1½-in. No. 12.

(c) **Internal Fittings.**—The box is to be provided on the bottom with V supports of spruce accurately made to the requisite form, shown in the drawing.

(d) A handle is to be attached to each end of the box by a cleat secured by iron screws. The handles



Plan and side elevation on left, and end view below of shell box required by the Shell Committee, Ottawa.



are to be made in the form of a spliced gummet of ½-in. diameter tarred manilla rope of the best quality obtainable.

3. **Material and Workmanship.**—The materials are to be of the best quality, thoroughly sound and free from defects. The wood is to be well seasoned. Where boards are made in more than one piece, the joints are to be made to clear the screw, and no piece is to be less than 3 inches in width; the glue to be of the best.

The external edges are to be chamfered off as per drawing, and the boxes to be delivered unpainted.

4. **Tests.**—The contractor is to intimate to the Inspector when the material is ready for inspection. All parts damaged by or during testing must be repaired or replaced free of cost, by the contractor, to the satisfaction of the Inspector.

The boxes will be tested by a strain applied to the handles equal to a dead weight of 350 lbs., and must be capable of standing this test without showing any defect.

5. **Marking.**—Each box is to have the following stamped on it in legible type, and all on the same end of the box:—

Contractor's initials or recognized trade mark.
Year of Supply
Numeral

6. **Inspection.**—If on examination of 20 per cent. of any delivery, 20 per cent. of those examined be found defective or incorrect, the whole delivery will be rejected without further examination. Any departure from the terms of this specification may involve the rejection of the boxes affected.

The boxes may be inspected during manufacture by, and after delivery will be subject to testing by and final approval of the Chief Inspector or an officer deputed by him.

Further, the inspector is to have the privilege of examining the lumber at any stage of manufacture, from the kiln to the finished box.

While electric light in the mill and factory is essential at times and has been of great assistance generally, there is widespread recognition to-day of the fact that sunlight is the most important of all. Mill and factory owners are concerning themselves more than heretofore with the question of providing plenty of natural light, both with windows and special lighting glass, and also by whitening the interior of the plant.

The making of fence rails of black walnut in times gone by is only one example of the wrong use of wood, for to-day we may find people using woods for ordinary purposes that would be worth more for something else, while another and cheaper wood would serve their purpose better. We are at a point in wood-working history where it is essential to make a close study of the adaptability of woods of various kinds.

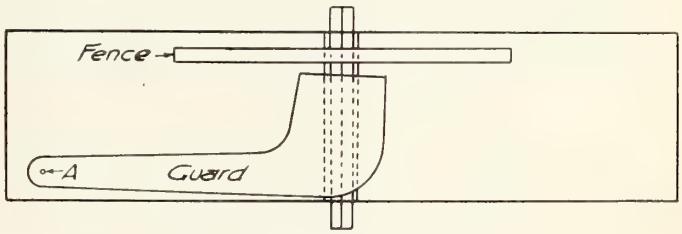
A large flagstaff has been got ready for shipment to England, where, as a present from the Government of British Columbia, it will interest the crowds of Londoners who flock to Kew Gardens, the famous botanical gardens a few miles up the Thames from London. The flagstaff is the most perfect specimen in existence, for from end to end it is absolutely without a flaw. When it was cut on the limits of the Brooks, Scanlon & O'Brien Company at Gordon Pasha Lake, the stick was 236 feet long, but 20 feet was cut off later owing to a flaw being detected. In its original state the stick was five feet in diameter at the butt, and 14 inches in diameter at the top, and as straight as could be. Since the workmen have finished dressing it into shape, the stick now has a diameter of 32 inches square at the butt for a distance of 16 feet. For the next 100 feet it has an octagonal shape, and for the last 100 feet it is perfectly round. The upper 200 feet is a gentle taper from 32 inches to 12 inches.

The Superintendence of a Small Plant

Specially contributed by Thomas Hogarth, Amherst, N. S.

IN the case of the superintendent of a small plant who has to act as factory foreman as well, he cannot well escape the blame if there is a failure to reap profits from the operation of the plant. Being a small plant, the workmen are constantly changing, and in his capacity as foreman, it devolves on the superintendent to "break in" the new man, and as his other duties take him away frequently, something all the time seems to be going wrong.

Most of these small factories run a specialty of some kind all the time which calls for repetition work. If the foreman will take the trouble to make patterns of all his different sizes and mark them plainly, much time can be saved looking up sizes to be made. Have the patterns near the cutting-out bench, so that the stock cutter can see the finished form of the piece he is cutting wood for, and can cut out knots, or include them if the future operations seem likely to remove them further on in process of manufacture. Similarly with later operations. Each man can see what the piece he is working will be like when finished, and can take the right operations in their proper order. If the superintendent had to convey all this information to his men verbally, and see that each one did as he was told, he would never find time to do anything else at all, but by just once impressing on each man the method by which to regard the patterns, he is saved further trouble. It is to be regretted that many superintendents are against imparting any information to their men, or regarding them as having intelligence beyond machines. Presumably, this is on account of his being afraid that they will learn enough to take his position, but he should remember that if he is the man for his job, he will not lose his place, and should be always ready to assist those under him to get better positions if they have it in them. By creating a feeling of good-fellowship among his men, they will support his work and use their best efforts in their work. The superintendent should not refuse to entertain new ideas and new methods of work which may be brought in by new men, but should carefully weigh the possible advantages to the factory before passing judgment.



A simple guard for a jointer.

The sketch shows an easily made and simple guard for a jointer. Cut a 1-inch board to the shape shown and secure to the jointer table by a bolt at (A) which acts as a pivot. This guard can be made to fulfil all insurance requirements, as it covers all that part of the cutters not in use.

Cost Accounting and the Institution of Piece-Work Systems

By Albert Hudson, Hespeler, Ont.

IN furniture factories, cost accounting, while intricate and varied, is of very great importance, and can be so systematized as to give complete knowledge, not only of the cost of production, but also of the efficiency of the machinery and of the various departments, along with every individual of the staff.

First: It should be a system that will give accurate information economically. Second: It must enable the management to know just how and where to cut down operating expenses, after carefully studying the analysis of the various reports brought in, and show where the production is not up to the standard and amount it should be, based of course upon cost of labor and material. Third: It must enable the management to know definitely that all the proper items are included in the overhead expenses.

A proper cost system reaches from the pay-roll, business expenses and materials used, even down to brass tacks, so that at the end of the month it is possible to know the amount of raw material in stock, the stock in manufacture, and the finished material on hand.

A simple cost system may be outlined as follows:—

(a) Productive help, namely: machine hands, cabinet-makers, finishers, trimmers, and packers.

(b) Non-productive help, namely: foreman, engineer, watchman, yardmen, and all help in the factory whose time it is a matter of impossibility to charge up to any particular job.

(c) All office help, namely: salesmen, bookkeepers, stenographers, estimators, etc.

By this it will be seen that the pay-roll shows productive labor in the factory, non-productive labor in the factory, and non-productive labor in the office.

In the category of business expenses, all the expenses outside of the pay-roll will have to be counted, including rent, if paid. Under this head include all insurance, every kind of advertisement, catalogues, circulars, etc., postages and telephones, also add fuel, light, travelling expenses, repairs to machinery, trucks, tools and building, glue, nails, screws, sand-paper, machine oils and brushes of all kinds, commercial reports, such as Bradstreet's, taxes, yearly subscriptions, interest paid, and discounts or commissions allowed.

Material: All materials figure out at actual net cost laid down in the factory for use. Hardware, varnish, polish, etc., can be figured at actual net first cost, adding freight, etc. Lumber should be figured $6 or $7 per M. higher than the actual cost, for kiln drying, handling, piling, etc. Instead of adding a percentage for waste, the writer's opinion is that it should be figured just according to the net amount scaled by the cutter as he cuts it. Adding a percentage for waste, as is done in some factories, is purely and simply guess-work, and it may vary anywhere from 5 per cent. to 50 per cent., depending mainly upon the lumber used and what it is required for.

In this way it is possible to arrive at a productive labor account in manufacturing at the factory end, a non-productive labor account at the factory and a non-productive account at the office. Then there is a business expense account and a material account. The writer believes that a safe basis to build upon can be had by taking the productive labor account as the foundation. This can be done readily as in the example.

The non-productive labor account at the factory end was one-fifth as much as the productive, or equalling twenty per cent. The non-productive office account was one-tenth as much as the productive labor account, or equalling ten per cent. The business expense account was one-fourth as much as the productive labor account, or equalling twenty-five per cent. Thus the following percentages would have to be added to the productive labor account:—Twenty per cent. for non-productive labor, ten per cent. for office help, and twenty-five per cent. for business expense. This will show the cost of running the plant, the labor, the business expenses, and the lumber handling, all being figured at the above percentages.

In determining overhead, the main problem will be to ascertain the proportionate percentage of the overhead expense. Some manufacturers have used the method of figuring lumber and labor only, then adding a percentage for overhead, while others have figured lumber, labor, and all other materials, and then added a uniform percentage.

The percentage of overhead expense in my opinion, however, should be as heretofore mentioned—the non-productive pay-roll at the office, with the business expense account added, should then be divided by the productive pay-roll. This will give the right amount to add for overhead in the first place on the amount of productive labor paid for, instead of in the last place.

Each job should bear the same proportionate overhead added to the total productive labor cost, and this will get the same percentage of profit on all. By adding enough overhead expense on the productive labor account to cover the overhead expense of doing business, it will be known just what is made on materials and articles sold. The same percentage of profit will then be made, and it will also be known that money is not lost on one article and made up on another.

This system is simply a method of basing the overhead expenses on the productive pay-roll and adding material, selling expenses and margin of profit afterwards. Thus, the longer a job takes to get out, the more of the overhead expense it has to carry, regardless of materials used. A job that stands in the factory three months will also be carrying more overhead than a job that only stands three weeks, which is only right, since the longer the productive help works on the job, the more overhead it should carry.

All this information should be reduced to the form of monthly records by proper book-keeping methods. By this method prices will equalize themselves properly, enabling the factory to get the same margin of profit on all finished products, instead of a large profit on some things and practically no profit on others.

That it is practicable to base the pay-roll upon the piecework system in many departments of a furniture factory, promises many ways of even greater economy in operating the factory, especially in regard to labor. The writer believes that the piece work system is the most practical and correct form of payment in any line of work, and if introduced wisely and carefully, can-

not fail to benefit both the workman and the manufacturer. There are many distinctive advantages in piecework, as the manufacturer is paying on this system only for effective labor. Another advantage is the amount of stimulus that is given to work throughout the department where it is introduced, when the men are put on their mettle.

A factory or department where the workmen are paid by the piecework system is pretty sure to be always on the move from the time the whistle blows in the morning until the last sound of the whistle at the end of the day. There is, as a rule, a better spirit among the workmen, they being highly pleased when they are put in a position to earn what their ability commands.

Piecework, however, has its disadvantages, as well as its advantages. While there is a tendency on the part of some workmen to slip their work, which otherwise would be accomplished by painstaking efforts, inspection must be constant and exact, and should be brought to bear in keeping the quality up to the standard. To maintain standards requires proper inspection of work done. The adoption of proper rates for piecework is a very difficult problem, especially where no direct cost system is in use, based upon time cards. Time cards, however, are sometimes very misleading. The writer believes that piecework rates should be based upon actual labor. A very satisfactory way to establish a piecework system might be laid out on the following lines. Having arrived at the average time required for a certain man to turn out, say ten dressers, which we will say is twenty hours, and for which you are paying him at the rate of twenty cents per hour, or forty cents for each dresser. Make him an offer of five per cent. increase on his pay for every ten per cent. increase on his output. If ten dressers cost $4, one would cost forty cents. Now suppose the workman turns out fifteen dressers in the twenty hours, your production has increased fifty per cent., and according to your promise, you must increase the workman's pay by 50 cents, therefore the man would receive $4.50 for the twenty hours, as against $4 for the twenty hours earned by daywork. For an expenditure of five cents on each dresser, you have not only increased the output of the cabinet room, but also made fifty cents on the work in the twenty hours, thus cutting down the cost of production. Again, take a workman gluing up drawers. This man glues up 150 drawers in ten hours, for which you are paying him $2. Make him exactly the same offer as the other workman, namely, five per cent. increase on his pay for every ten per cent. increase on his production. Now, suppose this man glues up 225 drawers in the ten hours, here again you have increased the production by fifty per cent.; you must, therefore, increase the workman's pay twenty-five per cent.

When a workman has found out that he is being encouraged in such a manner, the natural tendency of that man will be to greater efforts, and it is really surprising how he finds a way to do it. After a time, it will be found that there is no further increase in production and then will be the time to form a good basis for the piecework system. Careful handling at this particular time is very essential, so as not to create antagonism or discord. Of course, the prices for the work will be flat with no percentages.

Piecework prices will then be based upon actual labor of the men. This method should be satisfactory to both the manufacturer and to the workman, for a workman on piecework is only paid for what he does.

Belts, Bearings and Babbitt

By J. W. Smith, Berlin, Ont.

HAVING received considerable benefit from the able writings of some of the woodworking fraternity, as they express their views from time to time in the "Canadian Woodworker," and being pleased that we have here in Canada a purely Canadian publication that should be read by every woodworker in the country, I feel impelled to express my views in regard to certain things that may be of benefit to the beginner, if not to the older mechanic. I have deep sympathy for the boy as he starts to work in the factory. Some boys come to learn, others to fool away the time. There is after all no fool like a young fool, because in the nature of things he has a long time to live. Boys are a necessity in almost every shop. They will be the men of to-morrow. Let us help them.

In the first place, the best way in the world for a man to gain knowledge of his machine and of how to gain the best results is for him to start out and tell others about it, and endeavour to demonstrate its various points. Tell the boy. Let him feel the machine occasionally. Then watch him get interested. A

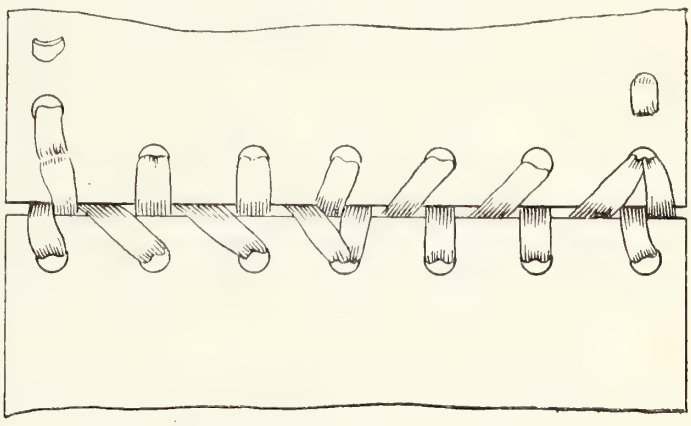


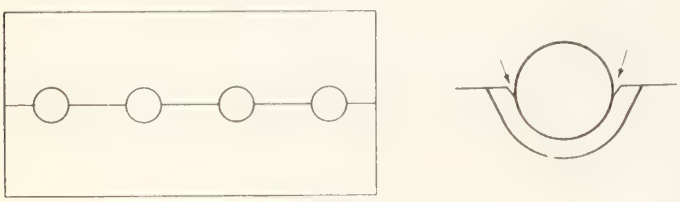
Fig. 1.

young fellow told me not long ago that he had worked on a sticker, but I found out very soon that it was the hind end and not the business end he had worked on. The trouble I find with some fellows is that they never get over being boys. They do things because the other fellow does it that way, and as a result, they are never likely to get far in their trade. Watt, the engineer, said that the thing of all things most wanted is mechanical engineering was a history of failures. We need a book of blots. I would like to suggest that the readers of the "Canadian Woodworker" be asked to send forward a few of the outstanding mistakes that they have personally made, and that they be published for our benefit. This should constitute a short cut to success. Of course, if there are any woodworkers who have made no mistakes, they should quit the business, for it is a sure sign they are not doing anything.

It is customary in most shops to shut down each year for repairs. In some cases, this is necessary. The better plan is to keep up with repairs. Repair that belt or babbitt that machine just as soon as you see the need. The number of otherwise good mechanics who still lace their belts is surprising. To my mind, the endless belt is the only proper way.

If you must lace a belt in case of emergency, use the hinge style. Punch one hole more in one end of the belt than in the other. Start in the middle of belt

through this extra hole and lace both ways to the outside, putting lace between ends of belt each time as in Fig. 1. It is well to taper end of belt both sides just a trifle. A belt laced in this way will pull straight and will not thump each time it strikes the pulley, but remember that the lace will wear out. To make an endless belt, or to shorten one that is already endless, I usually make a chalk mark each side of joint, say 24 ins. apart, or a small notch in the edge of splice will do as well. For an ordinary 5-in. belt a 6-in. splice is plenty, allowing 6 ins. for the splice. I have known men to allow for both ends of splice, and in the morning when they go to put on their belt it is too long. Make your joint with any sharp plane, a block plane being specially useful. Clamp belt to any smooth board and plane the end to a feather edge. Have two short 1-in. boards, say 1 ft. long and 1-in. wider than belt and planed to even thickness. Have these boards or cauls warm, lay a sheet of paper to cover same, and tack the belt to the board just back of the splice. If the belt goes over a shaft see to that next, for it gives a sickly feeling to glue up a belt and forget to put it over shaft. Tack the other end of belt to caul as before, being sure that edges of belt are in line and the distance between chalk marks correct. Use good joint glue, not too thin. Apply the other sheet of paper and caul and clamp securely with hand screws. For a new single belt, allow about ⅛-in. to each foot in length for stretch. For example, a 20-ft. belt, when



Figs. 2 and 3.

laced, would be replaced by a new one 2½ ins. short for stretch and 6 ins. over for splice, or 20 ft. 3½ ins. long. To measure length of belt use a steel tape line—they are more nearly exact than the ordinary kind. To find length of belt without the use of a tape line, add the diameter of the two pulleys together, divide the sum by 2, and multiply the result by 3 1-7. Add the product to twice the distance between the centres of the shafts and you will find the length required. Deduct for stretch and add length of splice.

I have come in contact with a few men who know so much about lacing belts that they won't try gluing them. They will tell you time is wasted waiting for a belt to dry. Plan your work, then work to your plan. Go over your belts each day if necessary. A few minutes before quitting time will repair the weak spot, and in the morning your belt is waiting for you. If there is anything worse than knowing too little, it is knowing too much.

I now want to explain how to re-babbitt an ordinary machine bearing. The same principles hold good with all machines, with the exception of levelling or alignment. For example, in preparing to babbitt a resaw you have things with which to contend that do not occur in planers. I have never yet burnt out a bearing, but accidents will happen in the best regulated families, so when bearings wear out or burn out, replace them thus: Remove all old babbitt, and in case some of it seems determined to stay in the anchor holes, take an ordinary drill and bore it out; but be sure it is all out, and that the boring is perfectly clean and dry.

When possible have an extra shaft to babbitt on, the reason being that some shafts or mandrels are apt to spring when the molten metal is poured on them. This springing proposition is less real than is generally supposed. At any rate, don't go into hysterics if you have not an extra shaft. Place your shaft, and top box if possible, in a heater; in any case get them warmed through before placing in position.

For this time, we will consider pouring bottom and top together, which I consider is the best way for any ordinary sized bearing, for the simple reason that the work is completed in one operation. Having procured a good piece of cardboard, cut to length of bearing and sufficient width, place all together and bandsaw to proper shape. Holes for bolts can also be bored if clamped together between two pieces of thin board. One liner on each side must fit tight to shaft, even with middle of shaft. To make this, take wider piece of cardboard and punch a row of holes up the middle with ordinary belt punch, and cut into two pieces through centre of holes as in Fig. 2. Place a small piece of belt or a wooden block in bottom, and be careful here, for too great a thickness of babbitt make a poor bearing. Next get your warm shaft and wind journals with ordinary writing paper, and fasten lap with mucilage or glue, or, if you want an oil channel, tie paper with stout twine, which will serve to mould the oil groove.

Place the mandrel in position, getting it level and square with other working parts. Put the liners in position, put on the top cap, which should now be thoroughly warm, and tighten the bolts with fingers only. Then see to the liners again, pressing the special liner firmly against shaft to prevent any metal passing, except through the small openings. Now tighten the cap bolts with wrench. Close the ends with cardboard cut to fit around shaft, also cover your cardboard washer with clay or putty, being absolutely sure there are no leaks. The good Book says it is the little foxes that spoil the vines. So it is the little things you neglect in babbitting that may cause you to have to do the job all over again. Build a funnel with clay or putty, if at all possible in the middle of boxing, leaving vents for air at both ends, and one in the middle. If convenient, leave one oil hole for an air vent and bore it out after. Heat the bottom boxing with a torch and you are ready to pour. Have plenty of metal and heat it so it will just brown the end of a pine stick. Pour as rapidly as possible without overflowing. The chances are you will have to heat more metal for the other box or boxes as the case may be, but do not let the shaft be disturbed until you are through. The manager does not usually question how long you were at that job if you have worked along steadily and have a good job when you are through, but he has a right to criticize if you neglected anything and caused the work to have to be done again. Remove caps with a light tap with a cold chisel, and cut the oil channels. Little scraping will be necessary except along the edge of the babbitt lining. If these edges are well opened up, as shown in Fig. 3, the bearing will take oil much better and carry it longer.

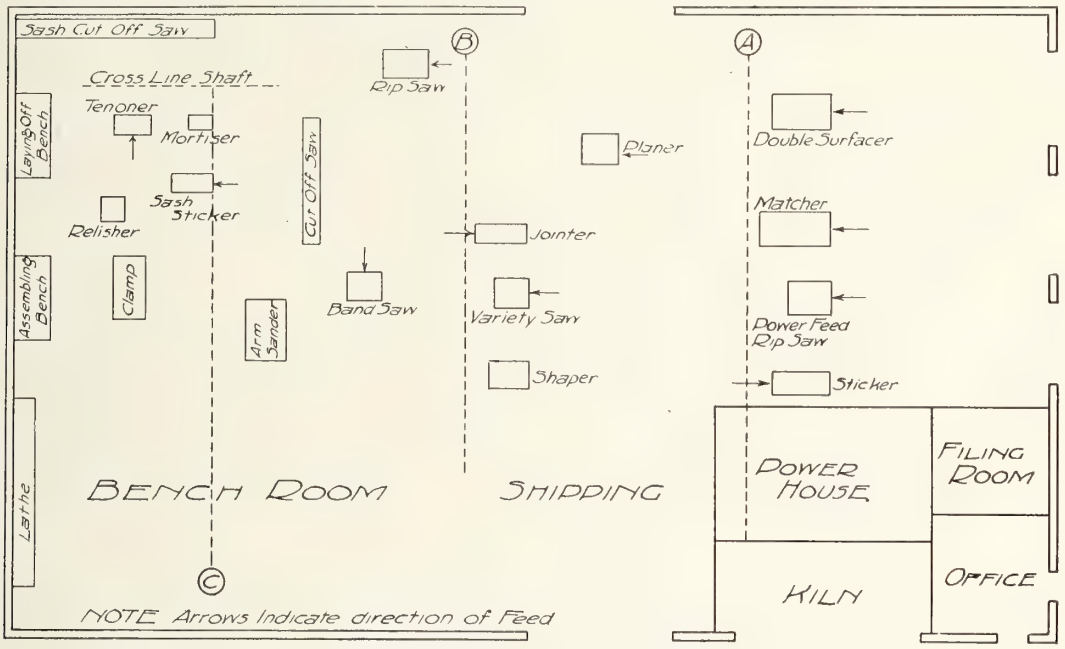
I have only just touched on one example of this very important subject, but even with this half knowledge, some fellow may find that the other half would come in very handy and strive to get it. If so, I shall feel I have helped someone.

A Near-Ideal Planing Mill and Sash and Door Factory

By B. A. Lake, Montreal

GIVEN that much of the time taken to manufacture an article, particularly in sash and door work where there are several operations to be gone through, is taken up in moving material from one machine to another, it is at the present time a leading object to so arrange the machines that material may be piled by the operator of one machine so that the operator of the next may be able to take it up without having to move the whole pile over before starting work on it.

In the accompanying plan the writer has endeavored to illustrate his idea of what a one-storey planing mill and sash and door factory should be. The machinery equipment is based on that of a mill in actual operation, but the arrangement is totally different. The machinery in the known mill is ample for its work, but it too often happens that machines are idle while



Suggested lay-out of machinery for the economical operation of a planing mill.

their operators are getting stock into position for work.

It is not my intention to describe the ways in which this particular mill was losing time, but rather to indicate briefly what a mill laid out after the accompanying plan should do to save time. As will be seen, there are three main line shafts and a short cross line, belted around a mule rig, to drive the sash cross cut and the tenoner. These shafts, where steam power is used, would be belted one to the other and driven from the one engine, but in case electric power is desired they could be driven each by a separate motor. This is rendered the more practicable since the planing mill equipment is driven from shaft (A), the general machines from shaft (B), and the sash and door department from shaft (C), so that a shut down of one line would only affect one class of work.

The size of the mill building, as indicated, would be about 60 ft. x 100 ft., but it is not shown absolutely to scale in the sketch, so that in some cases the distance between machines may be subject to modification according to the make of machine used.

The planing mill equipment for the purpose of this article consists of a double surfacer, chiefly for dressing sash lumber, and for that reason placed so as to feed out towards the sash stock saws. Next is the four-sided moulder, or matcher if necessary, to take lumber straight from the yard, and a power feed rip saw for sizing such stuff as is required for the sticker for detail mouldings. This small machine is made to feed in the opposite direction to the feed of the saw, so that stuff coming from the saw is in the right place to feed into the sticker without any carrying. A planer completes the load on shaft (A), though in some circumstances it might be desirable to belt this planer to shaft (B) in case it was not intended to run the planing mill section all the time. This would only apply when motors are used; with steam, which would have all the shafts running full time, the planer should be belted to (A).

Shaft (B) carries the general machinery necessary for jobbing and special work, including jointer, variety saw, shaper, bandsaw, and cross cut. A power feed rip saw is also belted to this shaft for sash and general cutting. This saw feeds out close to the sash cross cut, which is driven at right angles to the rest of the machines specially that there shall be no need to turn the long lengths of sized stuff as they come from the rip saw.

The cross line shaft that drives this cut-off saw also drives the tenoner, and thus stock goes in a practically straight line from laying-out bench to tenoner, and thence to the mortiser. From the mortiser, it goes back through the sash sticker to the relisher, where it is right in place to be assembled, clamped and sanded. Shaft (C) also drives a lathe, and is extended across the space left for bench room, so that one or two small machines, such as boring tools, may be put in hand to the benches. The relisher is preferably in conjunction with a hollow chisel mortiser for bar mortises.

A French process of "electro-curing" timber is stated to give perfect seasoning in a single night, and at little cost. With lead-plate electrodes on each side, the timber is placed in a solution containing 10 per cent of borax, 5 per cent. of resin, and a little soda. Application of the current expels the sap and fills the wood cells with the borax and resin.

The Market Situation and Outlook in Regard to Mahogany

THE situation in regard to mahogany stocks at the producing end is rather obscure as far as the consumer on this side is concerned, partly on account of the way in which prices have been affected by decreased demand following financial stringency and by increased ocean freight rates—both of which are the outcome of the European outbreak. Herbert E. Sumner, writing in The Furniture Manufacturer and Artisan, comments on the manner in which consumers have been buying only to fill orders on hand during the last few years, being followed in this respect by the manufacturers, who have kept their log purchases down to a point very near to the volume of their sales. Then, again, a great deal of misconception of the actual condition of stocks has been caused by the duplication of stock lists by manufacturers and wholesalers. These duplicated lists have been considered as representing different stocks, while all the time they covered identical ones.

This condition, coupled with only a fair volume of sales, was in effect when the first news of the struggle in Europe came. Then came a great pause in business, and especially among the lumber buying element. With sales of mahogany decreasing, and with his already heavy burdens, the manufacturer started in to cut the price of mahogany. Of all the fallacies of the present generation, this is the worst. It has been demonstrated time and again that "one cut in price begets another," and the buyer just "hangs fire" and puts off the date of purchase still further. And the longer he hangs off, the lower the price goes. And, of course, competing manufacturers lower the price still more. Then the mischief is done, and the manufacturer is taking a loss instead of a legitimate profit. You can't increase your sales in the backward swing of the pendulum of business by cuts in price. In other words, you may "realize" but you cannot "profit."

These were the conditions in the consuming end, and they are more or less the same to-day.

Now let us look to the conditions in Honduras and Mexico—these countries being practically the largest source of supply. Conditions in Mexico for the last year or two have been in an unsettled state owing to the warring factions. Practically no one could be considered safe in that country, and for the most part the camps were disbanded, and they will continue so until some permanent government is established. Concessions cost money, and there is no profit in a concession that must be "bought" over and over again each time a new faction is in power. The writer is given to understand that there is practically no logging of mahogany in Mexico to-day. There is, however, a small amount of Spanish cedar being cut on the "West coast." Mexico is therefore eliminated.

Before the war broke out most of the countries of Europe were buyers of great quantities of mahogany and Spanish cedar. Of course the United States consumed the major portion of both woods. Logging operations must be carried on through the fall, winter, and spring, so that the logs can be brought down the rivers and streams during the "wet season—generally starting the last of May. And logs that are left in the woods or on the banks cannot come down until the following year. Logs left in the woods are practically valueless owing to the fact that the "bush-worms" destroy them for use as lumber—they are not worth cutting up. Logs left in salt water are attacked by the toredo, and the boring of this insect completely honeycombs the log and renders it useless.

The beginning of the war caught most of the logging operators at the point where they were just starting to ship logs to foreign ports. Naturally Germany was shut off—one of the large buyers of mahogany. The logs were finally sold at a sacrifice—the loggers have for the most part sustained severe losses. The only thing that prevented the lumber that was sawn from these logs being sold at a much lower price (on account of the decrease in cost) was the rising cost of transportation—ocean freights.

Before the war, the cost of transporting logs from Honduras to New York was on an average of $17.50 per thousand for round-logs. To-day it is something like $30 or $35, and even more. Then, again, boats are getting scarce, and you must take your chances of getting a boat even at these high freights.

In view of the above condition, and from the fact that the only "open" market for mahogany is in a dull condition, it is small wonder that the logging operators did little or nothing this last season. If the writer's information is correct (and he has every reason to believe it so), there are but two or three camps working, and these only on a very limited scale.

So that to-day, when a manufacturer of mahogany buys logs, they cost him considerably more than they did. Consequently the lumber produced costs more. This then appreciates the value of all mahogany lumber on hand everywhere in this country. The writer can say that much less mahogany is coming into the country in logs than is being consumed, even in these dull times.

Manufacturers of mahogany who are aware of these facts are trying to show them to the consumer and to get the latter to "cover" his requirements for some time in advance. Any little spurt in business will send present prices up.

So much for Honduras and Mexican mahogany.

Now for African mahogany. Shortly after the war was declared, the heads of these logging camps "closed up shop," disbanded the crews and started off to join their armies. So the exportation of logs from Africa, with but few exceptions, is at a standstill. Liverpool is the principal port through which this wood comes, although some of it is brought in direct. One of the writer's business associates was in Liverpool last December, and even then there was little, if any, desirable African stock on the market, even for making into lumber, and none expected.

Prices, then, figured out so high that the logs f.o.b. the port of New York would be worth more than 1s and 2s African boards now on hand in this country. Freight charters on mahogany from Africa here would to-day be on a basis of from $60 to $90 per thousand. Mind you—that is the freight alone. Adding the insurance, war-risk, cost of logs, manufacture, piling, shipping, grading, etc., you can see very readily where the price of African wood is going, after what little stock now on hand in this country is consumed.

A concensus of opinion among those who are fam-

iliar with the conditions of African wood is that the scarcity of African will further appreciate the value of Mexican and Honduras mahogany.

East Indian mahogany has been in but little demand until lately, and there is but little stock on hand in either logs or lumber. The writer has just received information that Great Britain has placed an embargo on further shipments of this wood.

The Future of Teak

Teakwood (India) has been receiving much attention by the furniture manufacturers, and no doubt we shall soon see several lines put out. In Wanamaker's, in Philadelphia, there are a few pieces of out-of-door furniture that have been imported from England. Teak practically "keeps itself finished" owing to the natural oil in the wood. Its greatest consumption is in the construction of battleships. From 400,000 to 500,000 feet is used for each boat. The inner hull is built entirely of it, and the two steel hulls built on either side. This oil in the wood (which never goes from it) is a preventive of rust inside the hulls. The fact that the oil stays in the wood gives teak its value. No doubt many of you have either seen or read of the old convict ship that recently visited most of the ports on the Eastern seaboard. This ship was used for years in carrying convicts from England to Australia. After many years of service it was sunk off the coast of Australia, and remained under water for nearly seventy years. A company was organized some few years ago and the boat raised for exhibition purposes, and it has netted its owners a very comfortable amount. One of the writer's associates (an expert on teak) recently visited this boat, and stated that on scraping the side of the boat with his knife he found the wood just as oily as any teak sold to-day. This in itself is proof of the durability of the wood.

Teak has a great future. There is plenty of it, and it is accessible at all times. Certain lines of furniture, such as garden chairs, benches, porch furniture, and even furniture on the craftsman lines, can be readily put on the market. Some makers of furniture following the Japanese ideas are already investigating it. You must bear in mind, however, that teak costs much more than mahogany, and that it can only be sold to high-class trade and not to the medium or poorer classes.

Teak is generally brought over in "sizes"—timbers varying in length. The manufacturer here carries it in stock in this way and then saws it up to suit the orders he gets. Stock sawn from sizes in this way is generally sold "on length"—in other words, 6 feet to 9 feet one price; 9 feet to 13 feet a higher price; and so on. The price is made "on length" regardless of the thickness or width.

Lately, however, one manufacturer has been importing sawn-boards which he carries in stock from 1 inch to 2 inches thick and random widths, in lengths from 8 feet to 20 feet in absolutely perfect boards. These are sold at a lower price than boards sawn from flitches. The buyer of teak should remember that teak is measured on the quarter-foot, instead of the half-foot as in hardwoods.

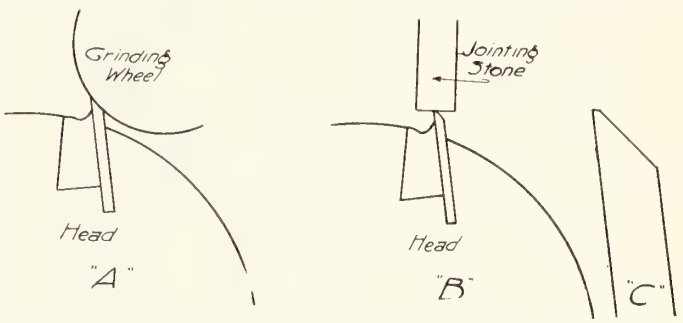
At the present time trade in this wood is growing, and there seems to be plenty available. China and Japan have used it for years in the making of their furniture. There should be no reason why high-class makers could not introduce teak furniture to their buyers.

Points on the Operation and Care of Planing Machinery

By Leo Forrester

THE operator of any type of woodworking machine should understand thoroughly the machine he has been elected to work with. He should know what and what cannot be accomplished with it. He becomes of greater value to his employer as a machine operator when he understands his work thoroughly and can keep his machine in continuous operation at maximum efficiency. If he can go further than that—create new work for the machine he is operatinfi and by doing so save money for the company employing him—he is taking a step forward that will enable him to reach the top of the ladder eventually. But to even hope to do this he must first become a dependable machine operator.

It goes without saying that a machine operator should have a practical working knowledge of mechanics. It is not enough that he should know that by making certain adjustments he will arrive at certain desired results; he must know why the results occur, and must understand the mechanical agencies that are employed to effect their accomplishment. For unless he knows this he will be very unsuccessful in his endeavor to get the full service from the machine.



"A" and "B" show grinding and jointing; "C" shows effect of excessive jointing.

The really good machine operator trains himself until he becomes so proficient that he anticipates trouble and corrects the cause before the actual trouble has been experienced. Instead of running the risk of being held up in the middle of a run, he goes over the machine carefully and sees that everything is in proper condition before the job is started. If there are any adjustments or repairs to be made he attends to the matter then. He knows the function of every bolt and spring on the machine.

Good oil and plenty of it where it is needed is as essential to the successful operation of a woodworking machine as water is to the life of a fish. Positively avoid using a grade of oil that is thin and watery, having no "body." Do not buy oil solely on a price basis. There is a vast difference in the results obtained from the use of different grades of oils. A cheap oil is dear economy if it has no redeeming quality other than its low cost price.

Use oil before it is needed. Do not wait for the machine to sound a warning by running hot. Neglect of this nature has been the cause of more burned-out bearings than the average woodworker realizes. Some parts of the machine, owing to their functions, require more oil than others; but every part that has a mechanical action whereby one part bears against another, causing friction, should receive some oil. Do not permit the oil wells and oil pipes of a machine to become stopped up with dust and shavings. On mach-

ines of more recent make the oil pipes are protected by covers, as they should be. If you are operating a machine that does not happen to be so safeguarded in that matter devise some sort of cover for the oil pipes yourself; it will pay you in the long run.

By no means the least expensive result of a burned-out bearing is the loss of time resulting. While the damage is being repaired the machine is temporarily out of commission. The tie-up may occur in the middle of a rush job and may be the means of a cancelled order. If the job is finished on another machine, rather than lose the order, there is an added manufacturing expense incurred by the second set-up.

If a bearing burns out it not only ruins the metal but it hardens the surface of the journal. The latter will never run smoothly again until it is permanently repaired. Frequently the burning out of a bearing causes a journal to become so heated that it is sprung. Repairing a sprung journal, especially if it is on an important member of the machine, such as the cutter-head, is a task that commands the ability of a skilled mechanic. Few repair shops are equipped to do this work with the care the work should receive. In its initial manufacture a cutter-head is made to run true within a fractional part of one-thousandth of an inch. Some of the big woodworking machinery manufacturers use extremely costly machinery for finishing their cutter-heads, grinding the journals to a glassy-like smoothness. What average repair shop is equipped to make a repair of this nature? Yet unless the cutter-head runs "true" the efficiency of the machine is materially handicapped. What is to be done? Is the machine to stand idle while the cutter-head is sent into the factory where it was made to be repaired? Not a desirable condition, surely. Would it not be far better in every way to attend to the oiling of the machine properly and prevent the bearings from running hot?

Watch your belts. Before shutting down in the evening look them over and see that they are in proper shape. A little inspection saves belts, shafts, and pulleys. Never use a bunglesome lacing in the cutter-head belt. As sure as you do you will be "cussing the machine" for doing poor work. Stock will come out of the machine showing chatter marks. This is because the thump! thump! of the lumpy lacing as it passes over the cutter-head pulley causes the head to jump. Excessive wear of the bearings results.

Personally, I think that the cutter-head belt of every planing machine should be made endless. It takes a little longer to glue-joint a belt, but any operator who takes an interest in his work and once tries the glue-jointed belt will never go back to the laced belt.

Be careful in the use of grinder and jointer, if you are so fortunate as to have a machine that has these lumber-saving features. Grind lightly, and avoid burning the edge of the knife. Grind off only what is necessary. In jointing just "true" the knives— taking off only the feathery edge. Jointing is not a sharpening operation. The more a knife is jointed the duller it gets—remember that. Some operators make the mistake of thinking that jointing sharpens the knife. Absolutely it does not. Jointing is an operation that brings all the knives in the head to a common cutting circle. If the work shows the effects of dull knives the knives should be put into proper condition by re-grinding.

Set the heads before starting the work. Frequently we see an operator who starts the stock in before the setting is completed, putting so much strain on side-heads and cylinders that there is a possibility of something breaking. Do not strain the cutting members of a planing machine. Do not use more feed roll pressure than is necessary. Have the out-feeding rolls just tight enough to feed the stock out.

Book Reviews

Furniture in England (from 1660 to 1760), by Francis Lenygon. London: B. T. Batsford, Limited; Canada: Woodworker Publishing Company, Limited, Toronto. Price $12.

It is a striking tribute to the art and craft of the furniture designer and manufacturer that the list of subscribers to this remarkably fine volume is headed by Her Majesty Queen Mary. The comprehensive scope of the work is suggested by the fact that it contains between 400 and 500 beautiful half-tone illustrations, not a few of them exquisitely coloured, and many of them occupying whole pages on pages 10½ by 14 inches. As the author points out in his preface, the character of furniture is closely interwoven with social history. In its different types and their shapes and decoration are reflected contemporary manners and customs and the changing fashions of the day. In no period is this illustrated more clearly than between the years 1660 and 1760—the period to which the book is devoted, and which may be regarded as the century in which English furniture was brought to its greatest degree of perfection. There is every evidence that the author has given the most careful consideration to the historical aspect of his subject. In a most interesting way Mr. Lenygon traces Continental influences and accounts for the fashions, such as Chinese and revived Gothic, which swept the country from time to time.

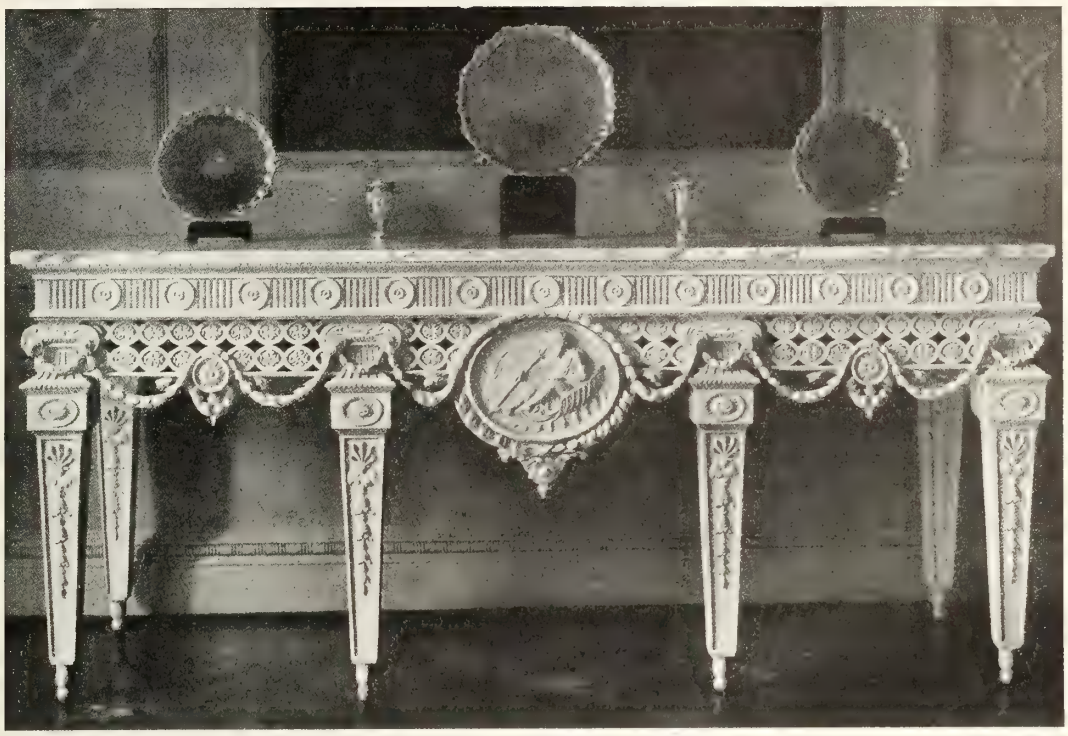
The limits of data have been fixed with the aim of selecting that period which shows the highest expression of the Renaissance spirit in England. English furniture previous to the Restoration was primitive, technically, and inferior in design to contemporary Continental work. After 1760 other influences were at work, and the furniture then produced in England comes under a different category.

Passing from the historical resume of the subject, to which the first three chapters of the book are devoted, we find a particularly interesting section devoted to chairs, stools, and settees, with their upholstery.

A chapter is given to beds, window cornices, and curtains. It is of interest to observe that their elaboration was due partly to the habit of ladies of holding receptions and of royal personages giving audiences when in bed. The bed, like the chimney-piece, has always had a highly decorative value, which is shown by such examples as the State bed formerly at Holme Lacey and that at Ramsbury Manor. Color-plates of fringes and bed hangings are given.

An especially interesting and well-illustrated section is devoted to tables. The single illustration we reproduce is appropriate in view of the article relating to the Adam style published elsewhere in this issue.

Bookcases, cupboards, and writing tables are discussed at length, and illustrated in most attractive detail. Pedestals, brackets, cabinet stands, mirrors and clock-cases are described in turn, while chap-



Side table of carved and painted wood, illustrated as showing the result of the influence of Robert Adam on contemporary designers. (From Lenygon's "Furniture in England.")

ters on veneer and marquetry, gesso, silver and silver-mounted furniture, and lacquer, complete the book.

"Furniture in England" is an encyclopaedia of information on the most interesting period of furniture history. In furniture, of all things, the skill of the worker is made manifest, and suitability of form is demonstrated most apparently. By all who are identified with the design and manufacture of furniture Mr. Lenygon's great work cannot fail to be received with acclamation.

Handcraft in Wood and Metal, by Hooper and Shirley. London: B. T. Batsford, Limited. Price $3.

The fact that the authors are Messrs. John Hooper and A. J. Shirley, lecturers and instructors to the London County Council, is a reliable guide to the thoroughness with which this book has been compiled. While the work has been prepared primarily for the teacher, the aim has been to render the treatment of the subject such as to make the work of value and interest to the craftsman and a useful guide for the pupil or student. In the course in wood model work, which is graded to cover a period of three years, the authors have embodied artistic merit in the designs, and have refrained from dealing with collections of joints which have only a limited mechanical value.

The first chapter of the book indicates the antiquity of craft work, and the three-year course in wood model work follows. In all cases the process of making each model is given in detail in a concise form, so that the necessity for methodical work is naturally inculcated in the learner.

Further chapters deal with metal work, and one chapter is devoted to drawing, designing and lettering as applied to wood and metal in craft work. The inlaying of wood is gone into in detail in the chapter on decorative processes, which is particularly well illustrated. This, perhaps, is the feature of craft work which permits of the obtaining of the most artistic results. The building, equipment and tools necessary in the carrying on of classes in handcraft receive special attention, and the last chapter (there are seventeen in all) is devoted to an explanation of the theory of the cutting action of tools. The whole subject of handcraft, both in wood and metal, is treated exhaustively, and apart from its value as a teacher's handbook, the volume cannot fail to have a highly educational value for all who have any interest in the artistic side of woodworking.

The Department of Trade and Commerce draws attention to the fact that Argentine offers a wide market for the manufacturer of office equipment. Although filing systems are used in the largest and most modern offices, they are not by any means general, business men not having been educated up to their usefulness. Some of the United States manufacturers, by securing energetic and aggressive agents, have been able to do a fair amount of business, and what is even more important, make their names well known. A Canadian manufacturer to be successful in this market, should send a representative to study the market and to form a first-class connection. One of the principal dealers in office desks recently intimated that in spite of the contraction in business, they had experienced a brisk demand for these goods.

War orders would appear to be worth looking into closely in view of the statement issued recently that the French artillery used more shells in one day's fighting in the Arras region than have been made in Canada since the war began.

The Shell Committee of the Department of Militia is authority for the statement that 125 woodworking factories in Canada are now engaged on the manufacture of shell boxes for the Government.

QUESTION BOX

A Practical Department of Reference for the Practical Man

Manufacture of Shell Boxes

Q.—"We have seen various articles on the manufacture of shell boxes, and there seems to be such a wide difference of opinion as to what a shell box is and how it is made that the writer would appreciate a little exact information concerning the different styles and their general make-up and use."

A.—The original shell boxes—and, in fact, the only shell boxes, properly termed—are those which are used to transport the steel shrapnel and high explosive shells from the factories where they are forged, machined, and loaded with their bursting charge of powder, their charge of lead bullets and the filling compound, to the explosives factory where the brass cartridge containing the propelling charge of cordite or other smokeless powder is attached. The shell box, then, is merely a carrying box, and is designed to be used over and over again as long as it lasts. Some shell boxes go across the water to England and never find their way back, while others are already beginning to be used a second time here in Canada. The box itself is a small one, about 16½ ins. x 13 ins. x 10¼ ins., made altogether of 15-16-in. dressed lumber, the sides, top and bottom being spruce and the ends and handle blocks hardwood—generally birch. The bottoms originally had a loose tray containing six large holes to take the butt ends of the shells, but this has now been superseded by a design in which the bottoms are thicker and the holes are recessed—a stronger construction with less waste. Each box has also a top tray bored with six smaller holes, which are countersunk to fit the tops of the shells, while the cover is cleated in such a way as to hold the six shells firmly between the bottom of the box and the top tray, allowing no side play and no possibility of the shells jumping out of the holes. The ends are castellated at the tops and the covers cut out to match, so that, once in place, the cover has to raise nearly an inch to become dislodged and come off. Each cover is provided with a cord at each end, knotted under the cleat, which when the cover is in place threads through a staple in each end of the box and furnishes one of the two ways of fastening on the cover. The other fastening consists of four screws driven through the cover into the sides of the box, the covers being drilled and countersunk by the manufacturers of the boxes. Each box is provided with two handles made of ½-in. tarred manilla rope spliced in a circle and secured to the end of the box with a block of hardwood grooved to receive the rope and fastened with five screws, the splice in the rope being at the top and furnishing the enlarged hand hold required. Each box is further reinforced by two steel bands, 1¼ ins. wide x No. 16 gauge band steel, which extends round the sides and bottom of the box and to within two inches of the top on either side, and is fastened in place by ten short heavy screws to each band. They are very strong, solid boxes, designed for, and fully capable of standing, long and hard usage, and present, in spite of their apparent simplicity, many problems of a new and interesting nature, not the least of which is the problem of getting them on the market without serious financial loss, as the price paid is very low for the quality demanded.

Another form of box, which is confused by some with the one described above, is the ammunition box, designed to carry four complete loaded and fused cartridges from the factories where the shell is assembled, loaded and fused to the ammunition bases in the field and elsewhere. This box is a long narrow one, and carries the shells lengthwise in cradles, the top layer being reversed to the lower layer—an excellent feature so far as balancing the box goes, but a bad feature for the manufacturer, for it necessitates the boring of several different sizes of holes in hardwood in the split divisions, the centre lines of which must be mathematically accurate, lest the shells be subjected to undue weight across the middle and become buckled or distorted sufficiently to cause trouble. This box is a dove-tailed one so far as the corners go, while the top and bottom are screwed on, and the box is provided with two bands similar to those on the shell box, but lighter and narrower. The handles on this box are of galvanized wire rope spliced and whipped across the hand hold with tarred marlin and secured to the box by a wooden block and screws in the same way. As stated above, it is the supporting blocks that fit on the inside of these boxes which form the greatest problem connected with their manufacture, and although the price obtainable for them is comparatively more liberal than that for the shell boxes, the margin in both is so small as to call for the utmost manufacturing skill and foresight if success is to be attained. The inspection of these boxes, too, has been a surprise, for, being new to every one, the specifications were capable of various interpretations, especially by inspectors, who were absolutely ignorant of the purposes to which the boxes were to be put, and who, in justice to themselves and their employers, took, as might be expected, the safe side by a wide margin, to the great embarrassment of the manufacturer, who, starting out with the carrying box or packing case idea, found himself confronted with standards worthy of pianos and furniture.

Boring Spruce

Q.—"What is the proper speed at which to run the 3⅜-in. boring bits used in manufacturing 18-lb. shell boxes? and how should they be fed? We have had a great deal of trouble in keeping the edge on our tools in the spruce used in these boxes, especially when knots were encountered, the tender point being the cutting lips. Should these bits be used with a screw point or a diamond point? and how hard is it advisable to run them?"

A.—The large number of holes of the size you mention in kiln-dried spruce certainly brings up some new and heretofore unsuspected problems in the boring line, the solution of which has a lot to do with the success or failure of the venture. When you stop to consider that in a five thousand lot of these boxes there are thirty thousand of these 3⅜-in. holes, which must be bored at the highest possible speed, located accur-

ately and cleanly cut, you begin to realize that there are new phases of old questions, and that this is one of them. Any one can bore the holes if he takes plenty of time, but these must be bored fast and by unskilled labor. The first thing needed is a powerful drill—one strong enough for all-round work in metal is not too large. It should have variable speed, and for this work should run at about four hundred turns a minute. If you prefer a diamond point on your drill, you should use a power feed, giving a chip about 1-32-in. thick, or feed it by hand, to achieve this rate of feed. If you must feed by hand, have your bit made with a screw point, pitched to the same feed. Clean cutting in wood never dulled a bit rapidly; it is the intervals of scraping cut while the operator is getting a new hold or stargazing that rubs the edges down and burns them. The cutting lips on the sides of the bit should be set back from the knife edge so they can be made large and thick, for the more metal there is to take away the heat of the cut the less chance there is of overheating the tips and consequent burning, which destroys the temper and makes rough work. Have your bits made of high carbon steel, and harden them so that it takes a good file to touch them. Use the file sparingly at that, for a coarse stone is better, as it makes a keener edge and takes off less metal than the file. These same rules apply to hardwood, and the most important points in the above are: slow speed and coarse feed; sharp edges and steady feed.

Disposal of Shavings

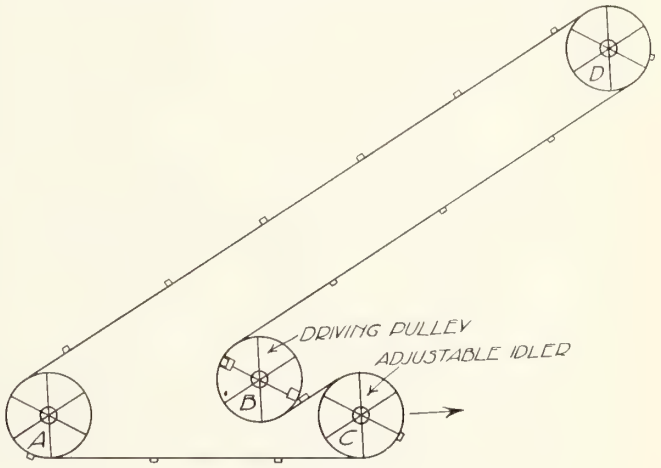
Q.—"Is there any profitable way of baling shavings, so that same may be turned to profit greater than might be realized by burning them for power? If so, can you refer us to some source of further information?"

A.—Baling shavings for shipment at the present time is about as unsatisfactory a process as could be imagined. The existing presses are simply revised hay baling machines, which, while all right for hay or any other material which has long fibres, are unsatisfactory for shavings. You can get a good bale all right, but you cannot hold it, for each handling flakes off some of the material, and the bale soon crumbles and is gone. There is a market for baled shavings in the cities for bedding for horses, and where it can be shipped with not more than two handlings it is cheaper to follow this practice than to throw it away—but that is about all. As things are at present you cannot get better return from the shavings than to convert them into power, and in order to use them to the best advantage for this purpose they should not be handled at all, but should feed by gravity into the fires, supplementing some other fuel, such as coal or oil, which can be cut off while there is a heavy flow of shavings and started on again when the flow of shavings falls short. Each fuel must be handled automatically—that is, the shavings and waste should feed by gravity, and the coal by automatic stokers, the latter being regulated by the steam pressure or condition of the fire to feed fast or slow as required. In this way the coal forms a bed for the finer wood fuel and prevents it from falling through the grates, while the large combustion chamber required for automatic stoking answers well for the feeding and burning of shavings and small chips such as come from the average lumber mill. The alternative is to run the plant at full capacity as far as the shavings will go, and supplement it with electric power from some outside source when the supply of shavings is low. This, however, necessitates full electric equipment throughout the mill; but it is entirely feasible provided suitable arrangements can be made with the outside supply.

Refuse Conveyor

Q.—"We desire to build a scrap wood conveyor which will discharge our wood commonly sold for kindling in a pile about fifty feet away from the mill. The source of this material is the first floor, and the carrier must be built on an incline which will result in the slope being nearly one hundred feet long. Of course, the logical point from which to drive this would be the top end, but this necessitates considerable expenditure for shafting, gearing, or a motor. Can a conveyor be built to drive from the bottom sprocket? If so, a sketch of the outfit would be greatly appreciated."

A.—The writer has seen a number of conveyors in which the original maker tried to drive from the bottom, but with absolutely no success, as the chain will lie slack on the carrying surface, and if tension is applied a stick or something always gets caught in going round the sprocket, and breaks the chain or does other damage which causes expense and delay. There is, however, a method of driving which allows the power to be applied near the bottom, which gives an absolutely satisfactory rig, and in addition is not expensive to build. In the attached sketch is represented a conveyor of the type you desire to build. The usual top and bottom wheels are provided at A and D—in this case, however, being flat faced pulleys, acting only as idlers for reversing the chain and keeping the buckets straight. The driver is the sprocket B, and has two openings in its rim at opposite points to accommodate the buckets as they go round, the driving power, as will be seen, being on the reverse side of the chain. Two slots are provided so as to allow a close spacing between two buckets if necessary to adjust the length of the chain. Passing round B, the chain is reversed again by the sprocket C, which is merely an idler for taking up the slack of the chain from time to time, and for this purpose is mounted in adjusting bearings, capable of being moved along their supports in the direction of the arrow. Screw adjusting buckets are all right, but simple wooden blocks placed behind the bearings and nailed in place afford the surest form of locking and the most permanent. This carrier will take anything that can be handled by any chain, and pieces of wood becoming caught in any of the sprockets do not bother it at all provided there is a space left at G so that any wood returning along the reverse side of the chain will drop out before it reaches the sprocket B. The slower you can run a chain carrier and have



Layout of refuse conveyor.

it take away the material the better; so look carefully to your bucket spacing, and fix things so that you can change the speed of the chain if necessary.

Belting a Resaw

The diagram herewith should assist "Planing Mill" to solve his belting problem as expressed in last month's Question Box. The drawing requires little explanation, but it may be said that the arrangement shown consists of a pair of vertical posts placed near the driving pulley of the resaw as indicated and carrying two idlers. The upper one is fixed—strongly, as it has to take the strain of the driving side of the belt when the machine is in operation. The lower idler is made to move up and down on the vertical posts, being carried on a sliding frame for that purpose. By means of a cord passing over pulleys on the ceiling the frame carrying the idler can be raised to take up the slack of the belt when it is driving the machine. When the resaw is not in use the idler pulley can be lowered

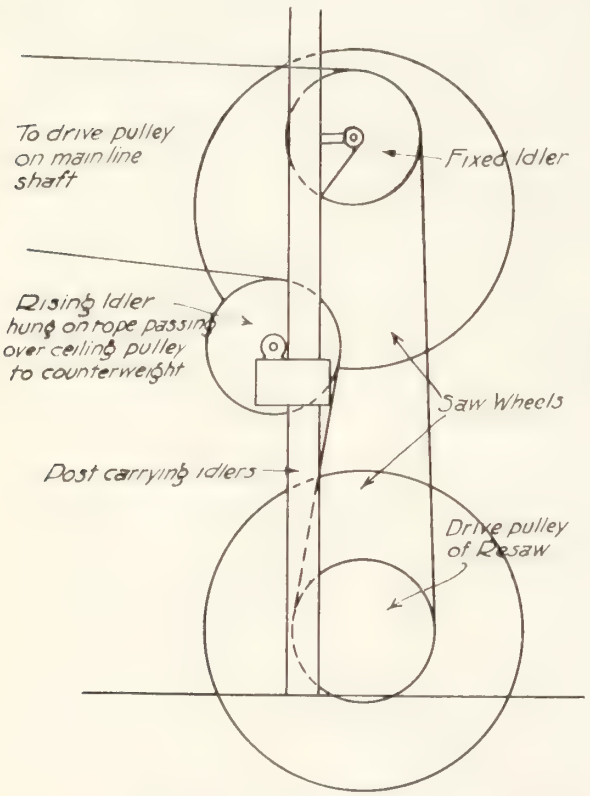


Diagram of arrangement of idlers.

so that the loose pulley on the drive-shaft of the machine is not worn by the running of the tight belt.

A belt shifter is mounted on the frame, and guides the belt just ahead of the upper or fixed idler pulley, so that excessive wear of the belt is prevented when shifting backwards and forwards. The movable idler may be held up to the belt by means of a counterweight on the cord or with a small hand winding gear. This arrangement has been made to carry long belt drives to resaws before, and has given satisfactory results.—**M. L. Cannon, Calgary, Alta.**

A Foaming Glue Spreader

Answering the query of "L. J. C." in the June issue of The Canadian Woodworker, I might say that I think that much of his trouble in connection with glue foaming when used on the spreader may be due to excessive speed of the rolls. This will cause a quantity of air to be drawn into the glue mixture at every revolution of the rolls, and it is the presence of air that makes the small bubbles or foam. It is evident that the fault is not in the glue, or the trouble would be equally apparent when applying with a brush. "L. J. C." should reduce the speed of the rolls and make sure that the rolls and containers of his spreader are kept clean. Much of the success of a spreader may be determined also by the surface of the rolls. These should be corrugated—finely for woods which do not require much glue, and more openly for those which will absorb more glue. Generally speaking, the fineness of the corrugations should vary with the fineness of the grain of the wood to be glued.—**F. G. Ford.**

Individual Exhausters

Q.—"What is your opinion on the subject of individual fans or exhausters for machines which produce a quantity of shavings or sawdust?"

A.—The question of individual fans is a pretty large one, and the way you look at it depends largely upon whether your mill is completely equipped with the single large exhauster or whether you contemplate building and equipping a plant. In the case of the new plant the individual fan offers the most advantages, and is by far the cheapest in the end, for it can be installed as required, and each fan, by operating only with the machine it clears, takes a minimum amount of power, while at the same time the draught can be made adequate and ample without over-crowding existing piping, as always happens in any mill that keeps installing new and different machinery to keep pace with the demands of its business. Perhaps, after all, a combination of the two outfits would produce the best results, for the main machines for producing shavings and sawdust are planers and band saws, which generally occupy the same locations and take about the same draught under any conditions, while the smaller and more troublesome trimmers, groovers, variety saws, drills, etc., which produce a lot of waste which is pretty well spread out, would be best served by individual blowers discharging into the same separators as the large outfits, protected by suitable check valves to prevent the pipes filling up while the larger units were in operation. The individual exhausters may be installed as required; take less power; take smaller and cheaper piping, which may be used over with a minimum of labour; and above all give a good draught just where it is required.

It is common knowledge that with the aid of chemical research fortunes have been made out of the utilization of waste products. The Timber Trades Journal of London, Eng., tells of investigations which disclose possibilities in relation to sawdust, although it would be perhaps unwise to rate expectations too highly. Our contemporary observes: "Artificial manures used in agricultural operations are, it seems, largely based upon potash, which in normal times comes in considerable quantities from Germany. There is a large amount of potash contained in the enormous quantities of wood scraps, sawdust and shavings from planing and other machines. Results of analyses of various samples of ash and flue deposit are given, and some are said to be as valuable a manure as kainit. On the basis of the present prices of kainit, some of the ashes of which analyses are given, show a manurial value of from 25s. to 50s. per ton. Expectations should, however, be moderated when it is said that since timber is relatively poorer in potash than leaves, bark, twigs, etc., the value of wood ash and flue dust obtained from sawmill furnaces will be less than similar

ash obtained by burning the undergrowth and waste of forest or woodland, although still constituting a lower-grade fertilizer. The belief is expressed that since ash is almost purely a waste product, there is good reason to suppose that it could compete with certain artificial manures even in normal times. The investigations, which have been made mainly from the chemical side, certainly open up commercial possibilities which we commend to the notice of the various associations of sawmill proprietors."

Canada is playing a part of growing importance in supplying the allied armies with the munitions of war. The latest development in this field is an order worth $83,000,000 from the Imperial Russian Government. This huge contract, which calls for five million shells, has been obtained in Petrograd by Mr. W. W. Butler, Senior Vice-President of The Canadian Car & Foundry Company. The extent of the order is such as to necessitate submitting various parts to other firms for manufacture, especially as three of The Canadian Car & Foundry Company's plants are already turning out shells to the order of Great Britain. Mr. Butler anticipates development of the Russian-Canadian trade on permanent lines.

The Hardwood Market

THE hardwood lumber situation continues quiet. If anything it is a little more even in tone than it has been for some time. Although pessimism is expressed by those whose businesses are not constituted to withstand temporary strain such as is common now in the business world, a quantity of hardwood is still moving. The pessimists are also complaining of the difficulty of securing profitable orders. It is true that there is not so much money to be made in the business now as would be consistent with the allowing of much profit on operations, but firms who are well established are able to command enough business to keep their organizations together, and without operating at a loss even at that.

In considering what things may be like later on, we have to look at the duration of the present situation. This has existed so long that it seems hardly possible that there will be any further decline. There was a decline, but it has been arrested and has been held for so long that it is only a matter of a little extra strength in one direction or another to start things on the upgrade again. This upward movement had been expected sooner, it is true, but considering developments in Europe and the present prospect of another winter of war, the condition of trade in hardwood lumber is reassuring.

The factories are still continuing their policy of keeping stock at a low point, and this has been a factor in making the market more even in tone. No large sales are reported this month, but there is an even demand, rather lower than that for the same period of last year. Prices are still holding, although at a little lower level than at this time last year. Prospects of an immediate revival are not particularly bright, but the amount of business being done will not permit the market to be characterized as dead yet.

The building trade is still negligible as a factor in the hardwood lumber situation. The practical cessation of many activities in the constructional world has done much to make the market slow, all the present movements of hardwood being attributable to the factory trade.

The Southern Lumberman (Nashville and Memphis, Tenn.) comments on the situation across the line as follows:

The hardwood situation can be said to have changed but little lately. Improvement has been small, but at the same time there have been no evidences of weakening either in demand or in prices. Values, in fact, have shown a tendency to stiffen, and manufacturers seem more determined than ever to hold them to a remunerative basis. At Memphis it is reported that a number of orders have been returned unfilled because the price offered did not come up to the manufacturers' ideas of present values. The market at Chicago is reported as holding its own, and the price tendency there is distinctly upward. Louisville dealers are expecting no halt in the present demand, and report an increased and rather unexpected call from furniture factories. These reports, while coming from important markets, are taken as typical. Increased demand from furniture manufacturers is not general, but in other markets the call from other classes of consuming factories, from the retail trade for construction work, and from the railroads, is such as to strengthen the belief that there will be no summer dullness this year, but that the present volume of business will be maintained with probably a steady but slow expansion in demand until a normal or close to normal business is resumed in the fall.

The quieting down of the international situation has helped all lines of business, and while wet weather has done some damage to crops over a large part of the surplus grain producing territory, this damage is not expected to materially alter the value of his crops to the American farmer, and increased business in all lines is confidently expected in the early fall months.

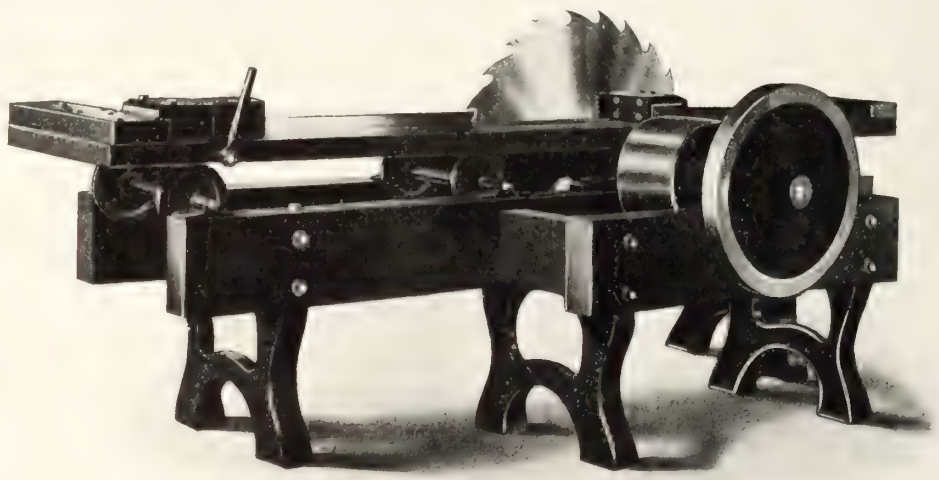
The demand for walnut for gun stocks on large orders for rifles for use of the allies becomes more and more a feature of the hardwood market each week. The country is being pretty well scoured for suitable walnut timber, and some red gum is also being used experimentally for this purpose. Call for cottonwood and low grade poplar and gum from box factories is also considerably increased. This is the season when a fair demand for boxes may be expected, but the boxing and crating of war supplies shipped abroad is adding materially to this demand. Railroad demand for car material and for construction timbers and crossties is also larger. Automobile factories continue to be consistent buyers, purchasing in fairly large lots. Hickory, ash and poplar are affected by this demand, and also by demand from vehicle manufacturers who have orders for supplies for foreign governments. On the whole, however, plain oak continues in best demand so far as volume of movement is concerned. Oak, maple and beech are all in fair demand from flooring factories. Other hardwoods show little change in demand, movement being light, but prices are held up very well.

A splendid rule for the planing mill which takes pride in its finished work is to inspect carefully all the work that is being put up to go out, so that any pieces not properly sanded and finished off may go back for treatment. This is not only a protection against sending out poorly-finished work, but it makes the finishers more careful of their work.

Sawing Handle Blanks

The accompanying illustration shows a splitting saw machine as used in the manufacture of handles for axes, picks, etc. A one-unit handle plant will include one of these machines in connection with two or three handle lathes, a throater, and a polishing machine. A splitting saw machine takes care of the first operation in the manufacture of handles. Butts or logs come to the factory in lengths about two inches over that of the finished handles. A splitting saw is used to cut the logs into slabs from which the handle blanks are cut by a blocking machine before being turned in the handle lathes.

The machine illustrated, made by the Klotz Machine Company, of Sandusky, Ohio, is specially designed for splitting up timber into planks or slabs, and can be used also for ripping up any kind of lumber. It has a hardwood frame, well bolted at the joints. The saw mandrel is of steel, and carries a heavy plate flywheel, the rim of which is turned to run dead true. Large turned rollers with steel axles and metal bearings carry the moving table, which is made from well-seasoned ash. In order to prevent warping of the table it is glued up from narrow strips. Iron tracks on the under side of the table run over the rollers. A chuck, which is adjustable for different lengths of work and is quickly operated by a handle, is carried on top of the table. Four sizes of this machine are made, to take saws respectively 26 ins., 30 ins., 36 ins. and 40 ins. in diameter, the power requirements for the different machines ranging from three to seven horse-power.



Splitting saw machine manufactured by Klotz Machine Company, Sandusky, Ohio.

Trade Inquiries

THE Weekly Report of the Department of Trade and Commerce contains the following inquiries relating to Canadian trade. The names and addresses of the firms making these inquiries can be obtained by those specially interested in the respective commodities upon application to the Inquiries Branch, Department of Trade and Commerce, Ottawa:

760. **Pipewood-staves.**—A South African commission house requests correspondence with complete information on patent wood staves for water pipe lines. Full particulars are requested in reference to the tools required for putting these pipes together, as they will have to be shipped in the knock-down state.

764. **Chair parts and dowels.**—A London firm is open to place orders for considerable quantities of chair parts and also dowels, and invites quotations from Canadian manufacturers. Samples are in the possession of the Department of Trade and Commerce.

773. **Woodenware.**—A London manufacturers' agent who claims a large connection among buyers of woodenware, proposes visiting Canada during the summer with a view to arranging for supplies of washboards, broom handles, dowels, skewers, clothes pegs, etc., either upon a commission basis or purchase outright. In the meantime he would be glad to hear from Canadian manufacturers who wish to negotiate with him.

795. **Birch bars for folding bedsteads.**—A firm in the English Midlands manufacturing folding bedsteads for military purposes wishes to get into touch with Canadian firms able to supply birch bars such as are used for this purpose.

805. **Woodenware; Church pews.**—A firm of manufacturers' agents in Cape Town, with branch houses in all centres, requests samples, prices and particulars of agencies in the following lines: Cash drawers, coat hangers, hat and coat racks, yardsticks and trouser stretchers; church pews in oak with bent seats and circular backs.

828. **Box shooks.**—A London company wishes to get in touch with Canadian manufacturers of wooden boxes 40 inches by 28 inches by 26 inches deep, in knock-down condition, bottoms and tops with their battens packed flat.

829. **Staves.**—A chemical manufacturing company in Cheshire are open to purchase 1,000,000 softwood (spruce, fir or similar material) staves: 42 inches by 3 inches wide by ½ inch thick, and invites quotations from Canadian manufacturers, preferably f.o.b. Garston.

Don't forget that a "floor varnish," fulfilling the usual claims made by the manufacturer for it, will answer for many purposes other than floor work.

Earn $50 to $100

during spare time

HOW often have you wished that you would like to increase your income during spare moments—some work which, perhaps, would be a little different than your regular calling?

You know the value of a Trade Journal.

Then you should enter this competition, in which the publishers of the Canadian Woodworker and Furniture Manufacturer offer cash prizes to the persons sending in the greatest number of subscriptions.

Prizes of $60.00

to the winners, and commission besides.

THIS is an opportunity for an active, enterprising man in every woodworking or furniture centre. Every contestant is assured of some returns for his labor.

The conditions of the contest are such as to give every man a chance as far as possible.

You may easily win one of the prizes, which, with the liberal commission added, will reward you many times for your efforts.

Canadian Woodworker Subscription Competition

The publishers of the Canadian Woodworker and Furniture Manufacturer, being desirous of increasing the circulation so as to include every woodworking and furniture establishment in Canada, and, as far as possible, every superintendent, foreman and employee who can be benefitted by reading the publication, offers the following prizes:

For the largest number of paid subscriptions sent in by one person by a given date	**$25.00**
For the second largest number	**15.00**
For the third largest number	**10.00**

In addition a special prize of $10.00 will be given to the canvasser residing in a town of less than 10,000 population who sends in the greatest number of subscribers.

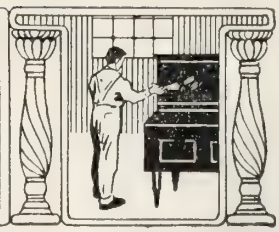
Contestants, whether prize winners or not, will be allowed a liberal commission on all orders sent in, but they must first write the Circulation Department for the conditions of the Competition.

Just drop a letter or a postal card and tell us you intend to devote your spare time to getting subscriptions. The details, with everything needed to commence work, will be sent you immediately. Mention the firm you are with. Write to

Canadian Woodworker and Furniture Manufacturer
Circulation Department,
345 Adelaide Street West, Toronto

Or to our Western Offices:—
Travellers' Building, Winnipeg, Man.
Hutchinson Block, Vancouver, B.C.

THE FINISHING ROOM



The Finishing Room of To-Day

IN common with the rest of the departments of the woodworking industry, the finishing room has had special attention paid to the matter of its equipment of late years, and the result has been to develop a line of apparatus, to say nothing of materials, for the use of the wood finisher of the present day that would make their fathers—if they followed the same trade—sit up and take notice, to use a popular expression. Perhaps a number of them would be found who would refuse to take notice, but who, like a few manufacturers of to-day, would incline strongly to the opinion that these new ways of speeding up the operation of finishing wood surfaces only defeat the object of finishing by giving the wood a poor appearance. Probably it has seemed rather incomprehensible to many that mechanical appliances should be able to do better work in the finishing room than the skilled workman with years of experience and a ripe judgment of all the causes and effects of the finishing processes. The march of progress has gone on, and mechanical means have displaced hand operation in most of the other departments of the woodworking plant; now it has reached the latest of all the operations, as it has done in many another of the world's industries.

Of all others, the finishing department had seemed to be the one that depended for the success of its work on the skill of the men employed in it. Now, although good men are still necessary, there is not so much of the personal equation necessary all the time. Instead of being constantly working over problems and experimenting, the finisher has to be able to use the up-to-date means placed at his disposal to determine his finish before he starts to apply it. Time is saved by having everything worked out on settled lines. All that is necessary is to have men who are intelligent enough to understand and carry out the processes which have been defined by careful investigation.

Formerly, of course, the finishing room was absolutely devoid of all mechanical equipment. All materials were applied with the brush, and sandpapering and rubbing were all done by hand. Finished goods were air dried, without any attempt to facilitate the drying or to keep the drying conditions normal. Consequently, finishes varied constantly, and it was up to the finisher to counterbalance differences in conditions by varying the finishing materials, and lacking definite knowledge of the varying conditions, he was always guessing, sometimes with luck and sometimes otherwise.

Now the whole aspect of the case has changed. Guesswork is eliminated—or, at any rate, it is eliminated as nearly as it will ever be. The modern finishing room resembles a laboratory; in fact, it is a laboratory, but instead of experimenting (except occasionally) it puts into practice the results of previous experiments. A good many processes in modern manufacturing have been perfected in the chemist's laboratory, but few of them require anything so near to a real laboratory as the finishing room of to-day for the carrying out of their commercial applications. This scientific appearance of the finishing room question is seen most prominently in the preparation of materials and in the regulating of drying conditions. Thermometers and hydrometers, besides fine balances for measuring out the finishing materials, all have a place in the factory finishing room. We cannot get along to-day with a few well-known colors and varnishes and a barrel or two of spirits and turpentine; we have to keep on hand a list of stock that is distinctly reminiscent of the drug-store, and to handle this the finisher has to know quite a lot, even if he does not have to be a good guesser. Much of the guessing has been done away with by the use of proper heating and ventilating systems to regulate the conditions of the finishing room atmosphere, besides the perfecting of special varnish drying rooms which have materially reduced the time necessary to finish furniture and other wooden goods. And the best of it all is that these means of hurrying up the finishing operations have not caused the quality of the finish to deteriorate; in fact ,the contrary seems to be the case. At any rate; results can be kept more uniform, and that in itself is a great deal in the eyes of the finisher.

In the mechanical part of the work—the application of the finishing materials and the smoothing of the surfaces before each coat—great strides have been made in the last few years by the introduction of the use of compressed air into the finishing room. One or two rubbing machines consisting of a pad moved over the finished surface by means of a connecting rod and crank have been known for sime time. These were real machines, of course, belt-driven from the line shaft of the factory, and they always seemed out of place in the finishing room. Now, by the use of compressed air, a small machine has been brought out which is not only better adapted to the work but looks more in place in the finishing room. It can be taken to the work, even to the extent of rubbing a top after it has been attached to the piece. This would be an impossibility with the old type of crank-operated machine, which had a movable table after the fashion of a belt sander. By placing sandpaper on the blocks of the rubbing tool it can be made to give good service on sanding down after staining and filling, as well as on rubbing varnish coats.

In the application of the finishing materials compressed air is utilized to spray the varnish or shellac through a fine nozzle, thus securing a very even application, with a minimum of waste. This air brush method has been adopted by some of the larger firms, but many think that it is only useful when there are large quantities of work to be done. As is the case with most modern equipment, the air-brush reaches its maximum efficiency when working to full capacity, but its use is not limited to such conditions. It effects a saving of both time and material over the brush method, and its actual economy depends only on the amount that can be saved in a given time in order to

pay interest on the investment. It is surprising, however, what savings can be made by its use on certain classes of work, even in small plants, and it is at any rate well worth investigation, particularly as it has passed the experimental stage, and data of its results in actual everyday use are available.

Not the least interesting development of the general spirit of finishing room practice is the passing of the finishing room floor as a place for drippings from shellac and varnish containers and brushes. Where finish is applied in this way proper dipping tanks and draining trays are imperative, and at present it is the exception to find samples of every kind of finish turned out by any department on the floor thereof. This perhaps is the most encouraging sign, for when the finishers get the habit of keeping their department clean they are helping themselves, besides showing something of a progressive spirit which is in keeping with the times. When a department begins to clean up it is a sure sign of the presence of ambition to improve matters all round, and generally indicates the beginning of an improvement in the quality and quantity of the output.

Sanding in the Finishing Room

Contributed by W. J. Beattie

THE consumption of sandpaper in the finishing department of a furniture factory and the labor entailed are of sufficient importance to deserve attention. The wood is sandpapered between each application of finishing material. After the filler has dried it is always best to sandpaper the tops and fronts of any articles that are in the medium or better grade classes, as there are likely to be spots that have taken the filler darker on account of a little roughness, generally caused by insufficient sanding in the cabinet or machine rooms and which were not observed until the filler showed them up. These, if allowed to go, would mar the appearance of the finished article by dark blotches, as if the filler had not been properly wiped off. In fact it is almost impossible to wipe filler off these "skipped" places, and the blame is frequently placed at the door of the filler man, when the fault is elsewhere in reality. So it is well to keep a sharp eye on the goods before the shellac is applied. Where the output is of sufficient volume, it is the usual plan to have men who do nothing but the sanding and wiping off between coats, and in that case their labor is cheaper than that of the brush hands. Practice makes them quicker, and this method is generally more economical in the use of sandpaper, as it is easier naturally to check one or two users of sandpaper than a dozen. For sandpapering the larger surfaces a pneumatic sander is a big help. This is simply a pneumatic rubbing machine fitted with sandpaper blocks, which will smooth a lot of surface much more quickly, easily and uniformly than the usual method and by which the fine worn sand belts from the sanding machines can be used. As these belts are used as fine at No. 0, it is quite practicable to use them in this way. It is also a time-saver to use compressed air to blow off the dust left on the articles after sanding with a small hose fitted with a nozzle and stop cock. If the sanding is done right in the varnish room this might be objectionable, as the air would raise too much dust, otherwise it is a good idea.

For some kinds of varnish sanding, steel wool will be found very economical in material and labor, especially on turned table legs, or on round chair stocks. The worker can be fitted with a coarse pair of leather gloves to protect the hands, and he can certainly do a great deal more work than by using sandpaper and without wearing his fingers "threadbare." It is just as essential to have the sanding well done as any of the other operations in the finishing room, for a smooth surface must be had if the varnishing is to be a success.

In a later article we will take up the rubbing and polishing of furniture, which are mechanical operations in the process of wood finishing following the sanding, and requiring even more care and skill on the part of the workman.

The First Aid Column

A department within a department to which Foreman Finishers and others are invited to turn for a solution of the practical problems encountered in their work. Readers are particularly requested to give the trade the benefit of their experience from time to time by replying to the questions asked. A number of new queries are to hand this month. They are given below. Be a live wire. Let us hear from you.

Wax Finish on Birch

We have a number of tables under construction which are to have birch tops to be finished with paraffine wax, so that acids or chemicals will not stain the wood. We do not understand this paraffine wax finish, and we are unable to find out anything in our locality regarding the means of doing this work. Therefore we are submitting the question to your paper in the hope that you will be able to give us some information as to where the necessary material may be obtained and how it should be used.—**The Sussex Manufacturing Company, Limited, Sussex, N.B.**

We would suggest that the paraffine wax be applied to the table tops with a large brush. The wax should be heated first—preferably in a double boiler, to avoid the danger of burning. In case the wax does not penetrate the wood satisfactorily, the surface may be rubbed over with a hot iron, which will melt the wax and allow it to be absorbed by the wood. We handle and manufacture about 85 per cent. of all the paraffine wax used in Canada.—**The Imperial Oil Company, Limited, Toronto.**

* * *

Our idea of the regular process for finishing wood with wax is as follows:—A heavy rub iron is used at a temperature of from 130 deg. to 150 deg. Fahr. A felt cover made to slip over the iron and white wax of a melting point not less than 124 deg. Fahr. is put inside the felt shoe. Care should be taken to get wax that is free from oil, or the wood will be stained. The cover with the wax is slipped over the iron and the heat of the iron drives the wax through the felt. The iron is moved over the surface to be finished with a pressure of at least one and a half pounds to a square inch of contact surface. As soon as the wood has absorbed sufficient wax a high gloss will appear, and the process should then be stopped. The wood should not be over-saturated. The foregoing process applies to hand polishing. With machine polishers the wax is sliced thin and placed on the wood. The polisher is then run over the surface and the pressure applied automatically.—**The British American Oil Company, Limited, Toronto.**

Red Cedar

(Question asked in the June issue of The Canadian Woodworker.)

I have obtained a quantity of red cedar lumber, and I think of making one or two small boxes or chests from it. How can these boxes be finished so that they will not look glaringly "new"?—**L. V. Janin, Quebec, Que.**

Answer by B. A. Lake, Montreal

The glaringly "new" look referred to in this query may be avoided by darkening the wood a little before varnishing. Red cedar has naturally a comparatively decided color, and the glossy surface given by the varnish accentuates this in a manner that may seem almost painful to some people. By applying a little light brown stain before finishing, the brilliancy will be dulled without spoiling the natural beauty of the figure of the wood. All rough knots should be filled carefully before applying the stain. One coat of shellac and two of varnish are applied over the stain, the varnish being rubbed down to a flat finish after drying.

Common Varnish Troubles

Varnish Cracking.—This may arise from different causes. Too much driers will cause it, particularly where the varnished surface is much exposed to sunlight Such cracks are extremely fine, or having a silky effect, and these fine cracks may open out much wider later on. The cracks caused in this way are sharp and clean-cut and cross the work in every direction. If too much driers have been used in the under coats the fact will manifest itself by the depth of the crack. The application of a quick-drying, hard varnish on a soft or elastic under coat is liable to cause cracking, thereby affecting the coating placed on it. This may also be traced to a gold size and turpentine glaze coating flatting on an oil ground-work, previous to varnishing. Gold size cracks may be recognized by their tendency to follow the direction of the brush work, the softer and more rounded edges than in the former case; they are also less numerous and more open in character. The application of a size coat upon a hard, non-porous ground previous to varnishing, such as may be seen in cheap work, or in re-varnishing, will sometimes cause cracks, particularly if the size was strong. These cracks are usually in polygon shapes with the edges curling outwards.

Drying from Bottom Up.—Drying from the bottom up, or drying from the top, means the difference between the surface drying of boiled oil and the more uniform drying of raw oil containing driers, as in paint. Taken literally, the statement is incorrect, because oxidation or drying must occur at the surface of the paint or varnish, and not at the bottom; but the term "drying from the bottom up" indicates, as stated, a certain process that is different from the usual drying of paint or varnish or plain linseed oil that is a strong drier or has driers added to it.

The importation of matches into the West Indies is extensive, but Canada seems to have done nothing to share in the trade. Although there is a large match factory in British Guiana, that country imported 3,586,680 boxes of matches in 1914 from the United Kingdom, Denmark, Norway and Sweden. Trinidad imported 6,240,160 boxes. Barbados imported 2,007,840 boxes from the United Kingdom and the United States. The Leeward Islands imported in 1913, 1,984,080 boxes. Thus the colonies within the preferential agreement import annually over 16,500,000 boxes of matches. Jamaica imported last year 5,861,280 boxes.

To Prevent Warping in Doors*

RECENTLY a writer gave his method of veneering doors in order to prevent warping when one side is veneered with oak and the other side with some other kind of wood. He had formerly veneered both sides at one time, but found that the doors warped badly.

"Finally," he says, "we hit upon the plan of veneering only one side of the stiles and rails one day, and the other side the next day. After both veneers were on we piled the doors in forms, with ½-in. sticks or binders between each layer. * * * They were then removed to the drying room and kept for thirty-six or forty-eight hours in a temperature of 95 to 100 deg., to remove all glue moisture. After they were machined and put together we found that there was no more inclination to warp in a door with two different veneers than in one that had the same veneer on both sides." The writer of the article also says: "It is true this method involves a lot of extra work over the ordinary run of doors, but it is more economical than to have doors returned on account of warping."

The extra work, as I see it, is in veneering one side one day and the other side the day following, and this extra work is entirely unnecessary. The writer quoted tried two new schemes at one time, and when success followed he was not in a position to ascertain which one accomplished the desired result. He linked the two together as one (veneering each side on separate days, and stacking away between strips to dry) and gave the combination credit for the success. The very operation that involved the great bulk of extra work, instead of contributing to the success of his plan, would operate in the opposite direction. The fact that the doors did not warp after each side had been veneered on separate days was in spite of, and not because of, that way of doing the work. There is nothing that will make veneered work warp more quickly than to have one side only veneered. The whole of the success which attended his plan must be credited to his system of drying after veneering.

Where one is experimenting he should keep each new operation separate, in order to be sure which it is that accomplishes the desired result. If one wishes to know what it was that prevented these doors from warping he has but to take four pieces and proceed as follows: First, veneer both sides at one time, and when taken from the press lay away to dry. Second, veneer each side on separate days and lay away to dry. Third, veneer both sides at one time, and when taken from the press strip and weight it so that it cannot warp, and place it for three or four days in a temperature of 100 deg. Fourth, veneer each side on seperate days and treat as directed for No. 3.

The data furnished from a record of experiments such as this will give positive proof of which is the contributing factor to success, and it is pretty safe to say that No. 3 will give best results. Allowing the stock to dry before releasing, so that it cannot warp, is the most important item in securing straight veneered work. Any man who is employing a method that involves a lot of extra work would do well to conduct a few experiments and see if he cannot safely reach a shorter and quicker way of obtaining equal, if not better, results.

* By B. M. Crosby in The Woodworker.

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Veneers and Panels

Problems of the Glue Room

THE extent to which veneer is being used in the manufacture of the better grade of furniture gives occasion for considerable thought as to the best conditions under which this class of work may be done, writes C. M. Mackay in The Furniture Manufacturer and Artisan. It would be impossible to lay down a plan in detail that would meet with universal acceptance because of varying local conditions that must be considered, and which exercise a decisive influence in determining which plan is best adapted for any particular place. But there are certain general principles which, if observed, make for success, and if ignored make for failure in the operation of the veneer room, no matter where it is. These principles it would be well for every man, responsible in any degree for glue and veneer room operation, to become acquainted with.

One of the first things to be considered is the room in which the work is to be done. This should be arranged so as to carry off all foul air by ventilation. But the means of ventilation should be so arranged as to eliminate all possibility of draughts. Where this work is done in large quantities it would be well to have it done in a building specially erected for the purpose. The ceiling should be high and dome shaped so that all the foul air will rise to one point; and at that point there should be an electric fan to assist in drawing up and discharging the foul air. This is much better than having a fan to blow fresh air into the room. If the foul air is forced out at the top fresh air must come in; but it enters in such small quantities at such a variety of points—around the doors and windows and through any little crevice that its entrance is imperceptible.

When Temperature Is Not So Important

Of course, should the time come when vegetable glue, which seems to be gradually gaining in popularity, will be the article of universal consumption for this work and entirely displace animal glue, the necessity for this elaborate preparation for ventilation will be greatly eliminated.

Temperature is an important factor in the glue room; but opinions have changed greatly in regard to this in the last few years. It is not long since some men contended that the higher the temperature the better. But more reasonable views prevail now, and on nearly every hand a moderately warm temperature is recognized as best adapted for both the men and the work. Very few to-day will advocate a higher temperature than 70 degrees Fahr. To do uniform work conditions must be uniform, which means that the temperature must be kept uniform. For this purpose a heating system easily controlled should be installed. Radiators, or separate coils of pipe should be used. If one coil or row of pipes is run through the room it is very difficult to keep a uniform temperature. But if the system is installed in sections, so that when the desired temperature has been reached part may be turned off and enough left on to maintain that temperature, regulation is much less difficult.

Good Light is Important

Good light is necessary for success in the veneer room. When it comes to matching fine fancy veneers the greatest care is required and good work can be done only in good light. The man at the glue spreader requires good light to insure an even spread and to detect spots if they occur. Light is cheap. The vault of heaven is full of it and all one has to do is let it in. Let it in from above as well as at the side. This will give uniform light throughout the room and eliminate shadows. Mistakes at the glue spreader come high if they are not detected at once and corrected.

Then there is the question of veneer room equipment. The factory that still clings to the hand press and glue brush can hardly consider itself up to date in this particular. It may be able to turn out just as good work as its more up to date competitor; but what about the cost? And cost is what counts in this day of keen competition. The man who sticks to antiquated methods of production has no reason to be surprised when he finds himself swamped in competition with modern methods. If the quantity of veneered stock consumed is too small to warrant the installation of fairly modern equipment, it would pay to buy the stock ready built-up from those who make a specialty of panels, drawer fronts and other built-up work.

Expert Veneermen Always

While it is possible for an expert workman to do as good work—if given enough time—with old-fashioned implements as can be done with modern appliances, it does not follow that the old-fashioned machines produce good work even when the extra time is taken, because a factory with old-fashioned equipment is not likely to have expert veneermen to do the work. Inexperienced men and old-fashioned equipment are a bad combination and would soon put any factory out of business. A modern mechanic is of more importance and of much more value than a modern machine. A good mechanic can do good work even though handicapped with a poor machine; but the best machine will not do good work if handicapped with a poor operator.

If you are interested in veneer room or glue room equipment and you are uncertain just what you need, look through the advertisements in your trade journal, write to the advertisers of the machines you think you may need, giving a description of the kind and quantity of work you are doing or intend doing, and then listen carefully to what they have to say. You will be certain to get some valuable information, and they will perhaps be able to save you a lot of money.

The Matter of Equipment

Speaking of equipment, let me say that in the making of veneered work one should keep an eye on his cauls in order to detect any places that are getting worn thin. Blisters frequently occur in veneered work without any apparent cause. But a careful examina-

tion of the cauls may reveal thin places that correspond to these blisters. These thin places create an uneven pressure, with the least pressure where the caul is thin; the veneer not being pressed to the core, the blister results.

While dealing with the question of cauls, let us throw out a reminder against the tendency to use them too hot. It is a common thing to speak of "hot" cauls, but they should not be more than warm—not too hot to handle with the bare hands. Much good glue is ruined through being burned with the cauls. The heat of the caul drives the moisture out of the glue into the wood and leaves the glue exposed to the heat without the protection of moisture. Glue is usually dissolved at a temperature of about 150 degrees Fahr., but this is always done under the protection of water. If we attempted to melt it in the dry state at that temperature, it would be ruined in a short time. So it is with glue that has had the water forced out of it by coming in contact with a hot caul.

In some shops the idea still prevails that wood that is being glued should be hot. It is not well to attempt to glue up cold wood, but it should not be more than warm. There are two or three very great reasons, chief among which is the fact that in veneering, if the core is hot, it at once takes up the moisture from the glue and leaves it too thick to take hold of the veneer when it is laid. Thus much veneer comes loose, for which the glue is blamed.

When veneer comes loose one of the first things to do is to ascertain whether the glue left the core or the veneer, and then examine in detail the process through which it was put in order to get at the cause. As a rule the glue leaves the veneer and clings to the core, because it is usually applied to the core in the liquid form and has a chance to penetrate and get a hold. This fact has frequently been responsible for the charge that the finishing room applied some "dope" that penetrated the veneer and loosened the hold of the glue. Glue will seldom, if ever, leave the core unless it has been put on the veneer first, and this ought never to be done. If any one used a hard maple core and was crossbanding with whitewood and using a very heavy glue to meet the requirements of the crossbanding, the glue would, in time, come loose from the core if the latter had not been prepared to receive the heavy glue by toothing or sandpapering.

In the successful laying of crotch veneer there are two things to be carefully watched: that the veneer is straight and free from wrinkles, and that it is dry. To many this will look like an impossibility, but it is not. If one does not use enough of this veneer to justify a redrier it may be moistened to make it pliable and then pressed between hot boards, such as basswood or other absorbing wood, until the moisture is extracted from the veneer. In this way one can have the most unruly crotch veneer both dry and straight.

Nothing will be gained by drying this veneer if we do not keep it from swelling after it is laid. It makes no difference to crotch veneer whether it receives the moisture by being stored in a damp basement, by being soaked in water before it is laid, or by being allowed to take it up from the glue after it is laid; the effect is the same in either case if the veneer is allowed to swell. The idea is to get the veneer under pressure as soon as possible after it touches the glue in order to prevent expansion, because the veneer cannot expand after the pressure is applied. When we remember that it is the shrinkage, the drawing together of the fibres of the wood through being relieved of moisture that causes checking, the reason for all this care will make itself apparent.

One reason why so many people have trouble with butt joints is that they do not get the work in the press quick enough. They take the utmost care in matching and taping the joints to see that they fit closely, but when the stock is taken from the press the joints have spread. But the strangest part of it all is that the joints have separated only at certain points, giving them the appearance of not having been cut straight. More than one man has made a perfect joint with crotch veneer only to find himself being blamed for poor work after the stock has come from the press. The question naturally arises: What was the cause of this? Here is the explanation. The fibres of crotch veneer run in various ways, twisting around each other in many fantastic shapes. Much of the surface of this veneer is end wood. This is what gives this wood its figure. When this veneer comes in contact with the glue the end wood parts take up the moisture very quickly and expand immediately, while the other parts take up less moisture and expand more slowly. The parts that expanded the quickest forced the joints apart at the points where expansion was slow. Hence the open joint.

European Veneering Methods*

By H. M. Merritt

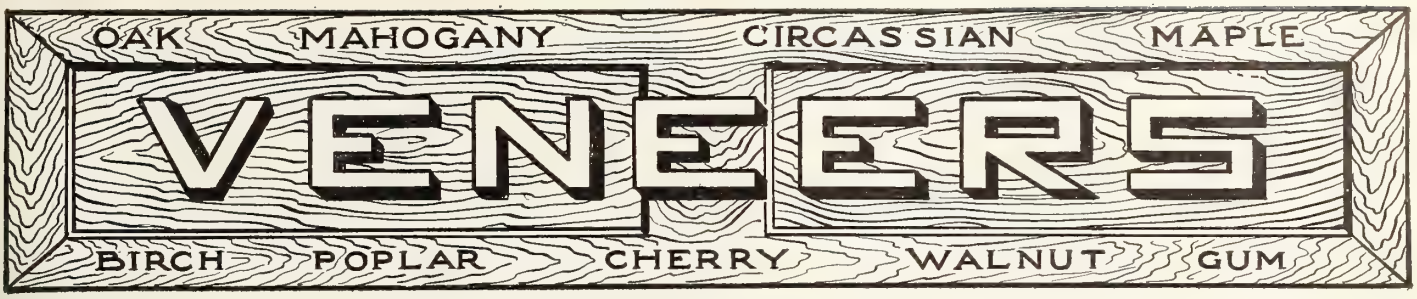
I WILL start by explaining that what we call built-up panels are universally called plywood or multiplywood in Europe, since generally the material is made up of as many plies as are necessary to obtain the required thickness. Often 2 to 4-in. stock is made up of many layers of 1-16-in. veneer. Imagine the durability of a panel made up in this way!

The methods of plywood manufacturing in Europe are geographical; that is, they vary in different localities. In the northern countries of Norway, Sweden, Finland, and Russia, the timber runs rather small, and here you will find that the process mostly in use is the building up of plywood from thin veneers that can be cut upon small-spindle veneer lathes, to get as much from the log as possible. In fact they really begin on a size where we leave off. There are many plants in Europe that would like to take our waste in cores to makt up into plywood. I have seen logs as small as 6 ins. in diameter cut into veneers, and, in fact, if some mills could get logs running 10-in. to 12-in., they would consider they had something pretty good.

No doubt you will say they cannot get very many face veneers from small logs. This is quite true; but here is where the multiplywood manufacture comes in. In making up stock of several plies of the thinner veneers, cut in the proper thickness to make up the required dimension, the manufacturer can cut all of his veneers of one or two thicknesses. And, as there is to be only one face and one back to each finished plywood, you can readily see that they can easily use all of the poorer quality of veneers on the inside.

I might suggest that many of you are leaving in the bush or wasting many good quality logs, averaging between 8 and 12 ins., that could be used to excellent advantage in cutting into cross-banding and backs, as well as faces, if you would equip yourselves with small-spindle lathes to work the cores down to, and possibly under, 3 ins. Many times, also, you have good, sound-hearted cores left from your large-spindle

*Paper before the National Veneer and Panel Manufacturers' Association.



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ENGLISH BROWN OAK,
CIRCASSIAN WALNUT,
BLACK WALNUT,
OAK, Plain and Quartered.
Sawed, 1-20, 1-8, 3-16, 1-4-in.
Sliced, 1-24, 120-in.
Rotary Cut, 1-24, 1-20, 1-16, 1-6.
POPLAR, YELLOW PINE,
BIRCH AND GUM
For faces, centers, backs, cross-banding and bottoms.

LUMBER

MAHOGANY,
CIRCASSIAN WALNUT,
AMERICAN (Black) WALNUT,
RED CEDAR.

PANELS

1-4, 5-16, 3-8-in. 3-ply and 5-ply, standard sizes.

HUDDLESTON-MARSH LUMBER CO.,

2256 Lumber Street
CHICAGO, ILL.

veneer lathes that have much good veneer in them. It would do us all good to take a trip across the pond to see how economically everything is used up, especially in Germany, where they do not even let the leaves go to waste. They use them for fertilizer, the fine twigs for street-cleaning brooms, and the branches for firewood.

In the central and southern countries of Europe we find the plywood manufacture more varied, as the timber is larger and they can afford to cut thicker veneers, and even use sawn lumber to make up core stock similar to our own. There is much wood brought in from Africa, such as Gaboon mahogany, which is used quite extensively. There is quite a variety of wood in Europe, but they have not learned to use much of it except birch, alder, Gaboon, and walnut.

The uses of plywood also are varied, the better quality being used for furniture, interior finish, parquetry flooring novelties, etc., and the poorer and cheaper qualities for drawer bottoms, cheap furniture, centre stock, boxes, tea chests, etc. One can hardly imagine the large field for plywood after seeing what is being done with it in Europe. One of my customers in Russia—the largest plywood manufacturer in the world, operating some forty veneer lathes—presented me with a beautiful travelling case made of birch plywood, finished in the natural and mounted with nickel-plated fittings and nameplate—a handsome and durable piece of work.

The plywood trade is unlike the panel trade in our country. Most of the manufacturers specialize on standard sizes, but vary the thicknesses and do not go into supplying innumerable sizes of dimensioned stock. This simplifies the manufacture, and the purchaser cuts from this stock to meet his own requirements. This is not, of course, the universal custom, but it is quite general.

Utilization of Waste

It would seem that the American manufacturer should not be called upon to furnish exact size dimension panels any more than the lumber dealer is called upon to furnish his material all dimensioned and finished to length, breadth and thickness, ready for assembling. If this could be accomplished, it would help to solve the waste problem in the veneer and panel plant, and the purchaser could select stock sizes that he could cut from to good advantage, thus saving the necessity of keeping in stock an endless amount of each and every size panel used in his manufacturer. I have seen plywood in various sizes, from the chair-seat size to 5 x 10 ft., each manufacturer specializing in only one or two standard sizes and running his plant twenty-four hours a day.

The marketing of plywoods is also different from what it is here. It is the universal custom to sell the product of a plant through brokers that handle the output of several mills, and in this way the user of plywoods goes to the broker and selects his sizes to meet his requirements. Most of these brokers are located in London.

Speaking of the utilization of waste, it has often occurred to me that if the American panel manufacturers would work their waste panel stock into some novelties or artistic articles they could realize quite a neat profit. There are many arts and crafts stores in our cities, and the American people are fond of fads, so that there should be a good field for some of you to think of utilizing your waste and overstock in this way. For instance, in my locality, for the last two or three years, the ladies have been very much interested in basket-weaving for amusement, using reed woven upon a board to make serving trays, card trays, etc. They started using a solid board and finishing it with a stain or white enamel. I introduced the use of mahogany, oak, and walnut panels for this purpose, and the result is that in the past year there have been used many hundred square feet of panel stock in my own town. This is only one of the hundreds of uses for which panels can be used, and goes to show that the public does not know that this material can be obtained. You will find that the foreign manufacturer is using every bit of his product and is not allowing a piece to go to waste that would make even a pin tray.

About a year and a half ago you had the pleasure of listening to a talk upon the Russian process of gluing green veneer by means of a water-proof cement, by Mr. Cronstrom, a native of Finland. He gave you a very interesting address, and no doubt many of you were interested to learn that this was being done. If this could be accomplished successfully in making up all kinds of panels, it would mean a great saving in labor now required to dry veneers and redry them, as well as saving many thousand square feet now lost in shrinkage and breakage in handling. This process is practical in making up the cheaper plywoods and using such woods as alder, but for the better qualities of plywoods, made up of birch and other woods, it is not so practical, on account of staining, checking and otherwise damaging the quality. I found that for the better quality of stock they were careful to dry their stock thoroughly first.

London is a large market for plywood, and on account of the climatic conditions it is necessary that the material should be as near water-proof as possible. Consequently most plywoods manufactured in Europe are made water-proof. This process is also much cheaper than the animal glues used in America. The cost is about $1.50 to $1.75 the 1,000 sq. ft. of three-ply for the material alone.

Another advantage is that the plywoods can be dimensioned and ready for shipment very soon after gluing and are not required to be kept in retainers for any considerable time to allow the glue lines to set. This process requires a hot-plate hydraulic press, which not only sets the glue, but dries the moisture therefrom at the same time.

For the manufacture of a cheaper line of plywoods for box material I would heartily recommend the use of a water-proof process; pressing the thin veneers in large sheets with a hot-plate hydraulic press, and dimensioning this plywood into box shooks on equalizing cut-off saws. In this way you can utilize all the products of the log and the process would allow you to dimension the stock immediately after it comes from the press. While the installation of a hot-plate press would mean quite an investment, it would effect a saving in material and labor and enable you to use small-spindle veneer lathes to cut veneers from smaller logs, that can be bought at a lower price than those you are now using. This would also give you quicker returns, as no time would be lost in leaving the glued-up material in retainers for a considerable time.

I have not fully decided whether this process would be really practical for making all kinds of panels, especially when a fine-figured thin veneer is used; but in making up the cheaper qualities and laying up thick face veneers, I should say that it would be a very cheap and practical method. Some experimenting would have to be done before this fact could be determined definitely.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

PENROD WALNUT & VENEER CO.

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Exclusively Walnut Lumber and Veneers

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Manufacturers of

Hardwood Lumber and Veneers

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Highest Grade — Right Prices

The largest Poplar Veneer Mill in the world.

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Chapter 1—Historical Notes
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Chapter 5—Glue Room Equipment
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345 Adelaide St. West, Toronto

Trade Happenings and Opportunities

Woodworking News from Coast to Coast

Charles Hutt has started a cooperage business at Buckley's Corner, N.S.

Mr. A. D. Barber, of the Barber Carriage Works, Alton, Ont., was in Ottawa recently, looking after Government orders.

O. & W. McVean, Limited, has been incorporated with a capital of $150,000 to carry on a timber and manufacturing business at Dresden, Ont.

J. E. Baechler, Goderich, Ont., reports excellent progress on his new furniture factory. Machinery was about to be installed at our last hearing.

The Orillia Furniture Company has received an order for 25,000 ammunition boxes. The making of the boxes will take six weeks and require 250,000 feet of lumber.

At Kentville, N.S., recently, the mill and woodworking factory of Charles Redden were destroyed by fire at a loss estimated at from $6,000 to $8,000. There was no insurance on the plant.

W. H. Pinner & Sons, who are putting up a box factory at Niagara Falls at a cost of from $6,000 to $8,000, are asking the local Council for free electric power and a fixed assessment for taxation.

Notice is given in the Ontario Gazette that the R. McDougall Company, Limited, have increased their capital stock from $30,000 to $250,000, to manufacture and sell woodworking machinery and tools and other implements.

From Granby, Que., comes the report that The Meyer-Thomas Company have closed a contract for one million wooden boxes, to be shipped to London, England. Messrs. Giddings, Limited, are shipping chairs and baby carriages to New Zealand, South Africa, and other distant parts.

Hartwell Brothers, Limited, of Walkerville, Ont., is a new company incorporated with a capital of $40,000 to manufacture and deal in hardware, woodenware, and lumbermen's supplies. The incorporators include J. A. Copp, of Walkerville, Ont., and F. G. and M. W. Hartwell, of Chicago.

The planing mill at Hamilton owned by Thomas Roussel & Son was set on fire by lightning early this month. The ensuing damage, which was mostly to machinery, is estimated at $8,000 or $9,000. At the time of the fire the firm was engaged principally in making cartridge boxes for the Militia Department.

The Chesley Furniture Company, Chesley, Ont., has finished an order for two thousand boxes for shells and the Chair Company completed an order for five thousand. Recently the Furniture Company received an order for five thousand more boxes and the Chair Company an order for a similar quantity.

The Paget Grain Door Company, Goderich, Ont., are busily engaged on an order for 10,000 shell cases for the Department of Militia. In addition they have branched out into the manufacture of auto trucks. Orders have been placed for new machinery which will be installed to facilitate the handling of the work.

The Matthews Sash Company, Fort William, have a contract for shell boxes running into $25,000. The boxes are built of inch lumber, partly pine and spruce, and partly birch, reinforced with iron bands and fitted with rope handles. They are to hold six eighteen-pound shells and must stand a strain of 350 pounds without breaking. In a recent test for the benefit of a Government inspector Mr. Matthews had one of his boxes tested up to 650 pounds without a seam budging.

At Sherbrooke, Que., it is proposed to grant the Canadian Box Mills exemption from taxation for a period of ten years, subject to the following conditions. The company are required to erect and equip buildings and install plant at a cost of from $10,000 to $15,000, and must employ thirty hands continuously and pay $12,000 annually in wages exclusive of travellers and office staff.

The Knechtel Furniture Company, at Walkerton, have received an order for 25,000 boxes to hold howitzer shells. The contract is worth about $20,000. Each box is made to hold two shells. The boxes are to be made of spruce, with maple ends. The order will take the Walkerton company about six weeks to fill. We understand that they will have an increased staff working overtime during that period.

It is reported that the B. C. Manufacturing Company, Queensborough, B.C., are so busy that a portion of their plant is running day and night, and that additional machinery is on order to enable the firm to cope with prospective business. In all, nearly two hundred men are employed. One of the reasons for this excessive activity is the fact that the berry season this year is about two weeks earlier than usual, and as a result the growers have been caught unprepared and every order for fruit boxes is a rush order of the most urgent kind. The B. C. Manufacturing Company are supplying practically all the fruit veneer baskets used in British Columbia, a business which formerly went almost entirely to the United States. This necessitates the installation of additional machinery. The company are also considerable exporters, sending out every month large shipments of box shooks to Australia. The last of these monthly shipments was for Sydney, N.S.W. It consisted of 3,500 cases, or about ten carloads. The boxes are used for packing oil in tins.

In connection with the Grand Trunk Pacific drydock, constructed at a cost of $2,500,000, and now approaching completion at Prince Rupert, B.C., there is a fine woodworking plant, which has been utilized in the construction of the dock and which will be used for repairing and building vessels later on. The plant is situated in the ship shed, and comprises the following machinery: Timber sizer 20 ins. x 14 ins., No. 109 48-in. band resaw, 40-in. bevel band saw, heavy wood frame saw table, pattern maker's universal saw bench, No. 5 improved heavy automatic cross-cut saw table 10 ft. 6 ins. long, No. 1 heavy power mortiser with boring attachment and clamp table, No. 2½ sash tenoning machine with double copes, No. 8 20-in. pattern maker's lathe, No. 1 20-in. hand planer and jointer with spur cutter, No. 200 30-in. automatic knife grinder with pump, No. 2 emery grinder, No. 49 double surfacer to take 30-in. x 12-in., band resaw sharpening and filing set, Fox No. 6 universal wood trimmer to cut 6 ins. high x 19 ins. wide, and Fox No. 8 universal wood trimmer to cut 8 ins. high x 24½ ins. wide. In the construction of the dock 4,000,000 feet of lumber was used for the pontoons, 800,000 white pine wedges for caulking the pontoons, and 3,000,000 feet of lumber for building the wharf.

John Steele, Manager of the Mount Forest Carriage Company, Mount Forest, Ont., was killed last month in an automobile accident near Listowel. His brother, Harry, President of the Company, who was driving with him, was seri-

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in three equal ply (one side clear), sizes 39 x 27 and 60 x 30, in thickness 3/20, 3/16, 1/4 inch, and at exceptionally low price.

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The saw can be set to cut at any angle and can be raised or lowered 8 inches. This operation makes no difference to the belt as is the case with other makes of machines. There is no overhanging slide. The table is clear of all obstructions; all work is in full view, and is operated with 1½ h.p. Motor.
Patented in U. S. A., January 16, 1912. Also in England, Australia and France. Other patents pending.

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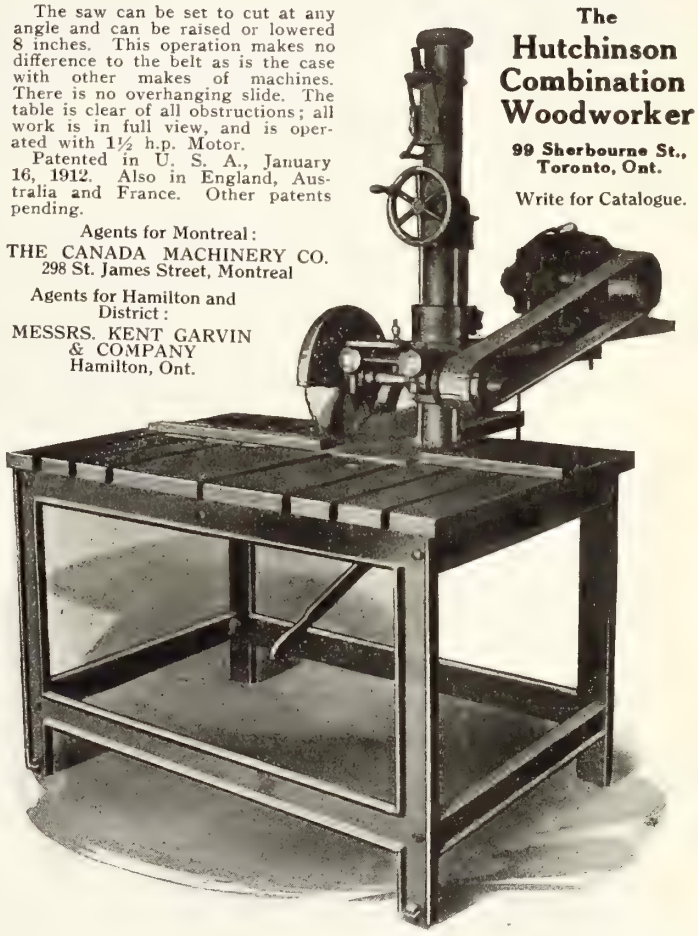
Agents for Hamilton and District:
MESSRS. KENT GARVIN & COMPANY
Hamilton, Ont.

The Hutchinson Combination Woodworker

99 Sherbourne St., Toronto, Ont.

Write for Catalogue.



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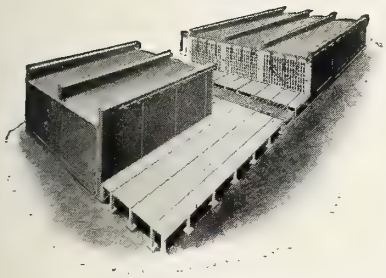

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MONTREAL - - Quebec

ously injured. The car was running at about fifteen miles an hour when it struck an obstacle in the road and turned over.

The death occurred in Listowel recently of Mr. John Bamford, who operated a sash and door factory in that town in partnership with his brother, Mr. R. Bamford.

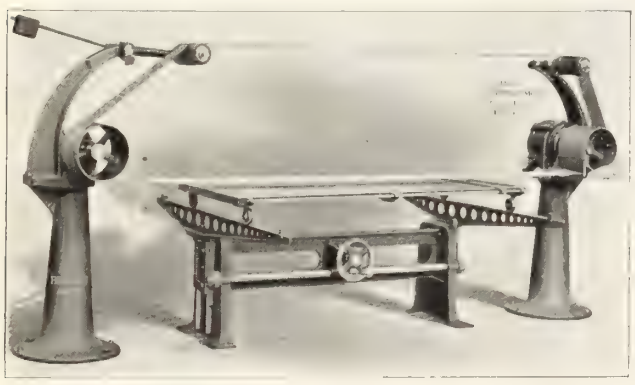
We regret to record the death of Mr. J. S. Richardson, lumber, sash, and door manufacturer, and President and Manager of the J. S. Richardson Company, Limited, Tilbury, Ont.

Mr. Charles Beck, of Penetanguishene, Ont., founder and head of the C. Beck Manufacturing Company, was accidentally drowned last month. The late Mr. Beck was a native of Himbach, Germany, where he was born in 1838. Coming to Canada before he was twenty, he took up the carpentry trade, and later purchased a sawmill. He removed to Penetanguishene some forty years ago, and engaged in the lumber business. For some time the operations of the Beck Manufacturing Company, Limited, have been supervised almost entirely by the sons. In addition to two large sawmills, a box factory, and a pail and tub factory in Penetanguishene, the company operate a box factory in Toronto.

A New Berlin Belt Sander

A hand-block belt tool, known as the Berlin "Universal" sander, owing to its ability to finish practically any size or shape of work, has been developed by the Berlin Machine Works, Limited, Hamilton, Ont. This machine is an entirely new furniture sander and is designed to work on all sizes of flat, convex, concave and other irregular surfaces. It is a finishing tool in itself, eliminating the necessity of hand touching-up on its own work or that of the big three-drum sanders. Mile-a-minute belt travel, coupled with absolute operative simplicity and convenience, lends such capacity to the average shopman as to save the time and wages of from four to eight experts sanding by hand.

The long sweep between the adjustable standards results in an extremely pliable, sensitive belt, allowing for getting into grooves or around corners and generally permitting manipulation to shapes of stock that a short belt cannot possibly get at. As the table, as well as the pedestals, are capable of adjustment of unusual latitude, material of great length and of exceptional thickness can be handled successfully.

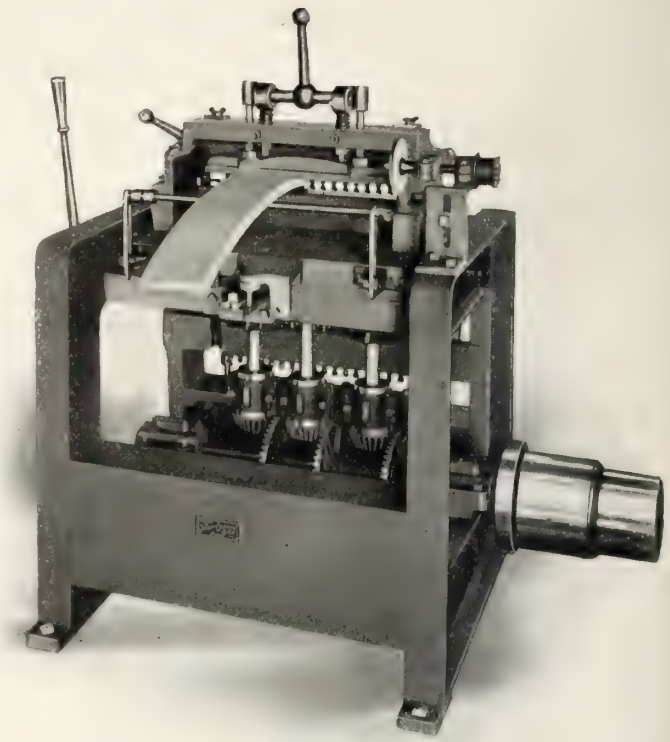


Berlin "Universal Sander"

Economy is further increased since neither pulleys or idlers touch the sand side of the belt, so that it clears itself and retains a fast cutting surface. No countershaft is needed, and little power is required to operate this "Universal" tool, which may be belted from any direction or direct-driven by a motor.

Dovetailing Ammunition Boxes

A machine that possesses a special interest at the present time is illustrated herewith. It is a gang dovetailing machine, of the latest type, and its peculiar application now is to be found in the manufacture of boxes for packing shells, when the specifications call for dovetailed corners, as it will do either the square or rounded joint. The machine illustrated is strongly built, and the use of gear drives for the cutter spindles has materially reduced the size of the machine from that of the older type, with belt drive direct to the spindles. Ordinarily, of course, such a machine is used chiefly in the manufacture of furniture, particularly in drawer work, and the one under consideration is designed to accommodate swell drawer fronts as shown in the cut, as well as the ordinary straight work.



No. 90 Gang Dovetailing Machine, manufactured by Jackson, Cochrane & Co., Berlin, Ont.

A particularly useful feature is a small emery wheel (shown on the top of the machine at the right-hand side). The wheel is shaped properly for sharpening the cutters of the machine, which cut on both edges, and which are set very close to the bearings to avoid chattering and breakage. Removable bronze bearings hold the spindles carrying these cutters, and the spindles are driven by steel machine-cut spiral gears, giving quiet running. The bearings are tapered, and are removable individually with the spindles without disturbing the rest of the spindles and bearings.

The operator of the machine has all the levers to his hand, and can see the die which rounds the tongue to the required arc of a circle. Swell fronts or straight work require no alteration of the table and clamping devices. Proper lubrication of the small inside bearings is not so difficult as might appear at first sight, as small pipes are provided to feed oil to these bearings. Three cut bevel gears on the countershaft mesh with bevel rawhide pinions on the intermediate shafts, which in turn drive the cutter spindles through their spiral gears. The economy of this machine, which is built by Jackson, Cochrane & Company, Berlin, Ont., for making corner joints, is apparent when it is con-

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(Not the ordinary kind)

Every board straight, flat and bright—PERFECT

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Order a sample car direct from the most modern hardwood operation in the world

Ideal sticking and piling, one side raised insuring unobstructed air ventilation

Every board carefully inspected, graded and branded with this Trade Mark

THE KRAETZER-CURED LUMBER CO.

Preparator boils out sap, eliminating danger of warping, checking and stain.

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At your service for prices and samples.

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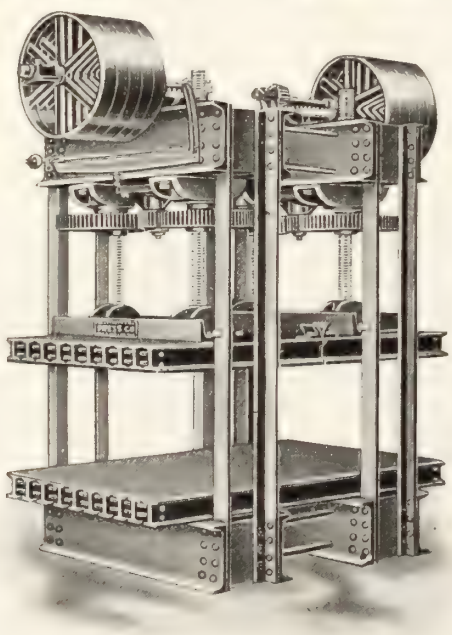

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Canadian Boomer & Boschert Press
Company, Limited
18 Tansley Street, MONTREAL

sidered that it is built in six sizes, having from ten to twenty-five spindles, to take wood from nine to twenty-four inches wide.

A Motor-Driven Swing Cut-Off Saw

The growing popularity of the direct motor-driven machine tool, with its great convenience, power economy, and safety, has been recognized by the Berlin Machine Works, Limited, of Hamilton, Ont., in the addition to their line of a new motor-driven swing cut-off saw, an illustration of which appears herewith.

One of the advantages of a motor-driven cut-off saw is the ease with which it can be installed in places not suited to the running of line shafts and belts, or in places remote from such a source of power.

Among the special advantages claimed for the saw is the manner of pivoting the saw frame below the shaft of the motor rather than directly in line with it. This results

Self-contained swing saw

in a tightening of the belt just as the saw enters the cut, giving the saw increased cutting power at the point where it is most needed.

The heavy, diagonally-braced, one-piece saw frame and the absence of all countershafting and side pull of belts keeps the saw free from the vibration usually found in saws driven from line shafts.

Provision is made for adjustment of the saw vertically and horizontally, and both saw and arbor pulley are equipped with safety guards.

Hens do not quit scratching because worms are scarce. In that respect they show an intelligence superior to some business firms which relax their energies and stop their advertising when business happens to get quiet.

7% INVESTMENT 7% PROFIT SHARING

Sums of $100, $500, $1000 and up. Safe as any mortgage. Business at back of this Security established 28 years.

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Write for "dope" on **gum drying.**

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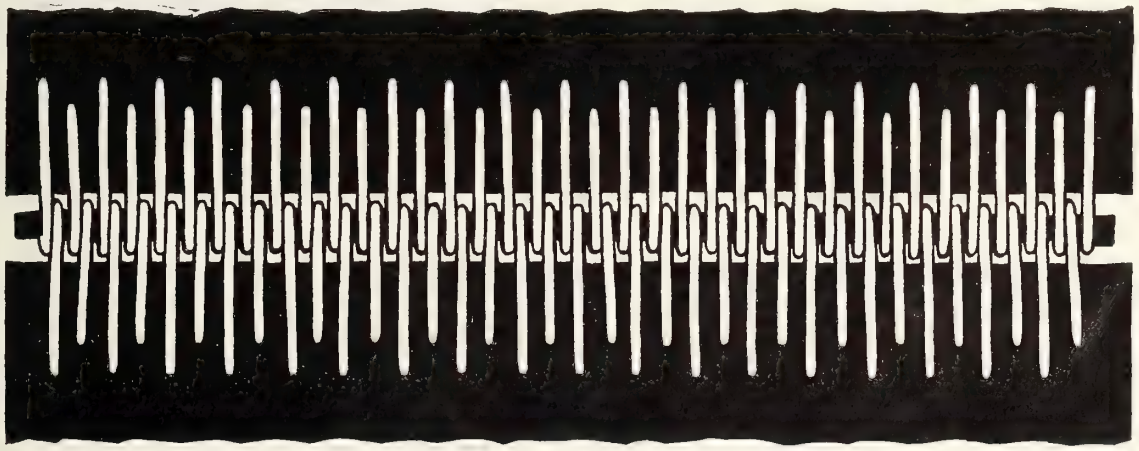
Makes a Durable, Flexible Lacing. **Flush with the Belt on Both Sides.**



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on such work as

CHAIR STOCK
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WHIP STOCKS
FLAG STICKS
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CANES
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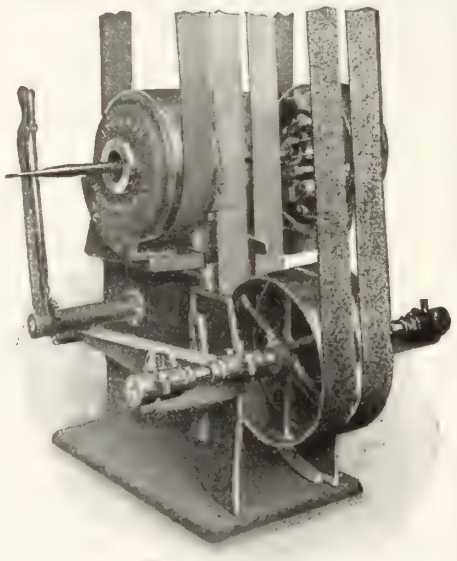
ETC.



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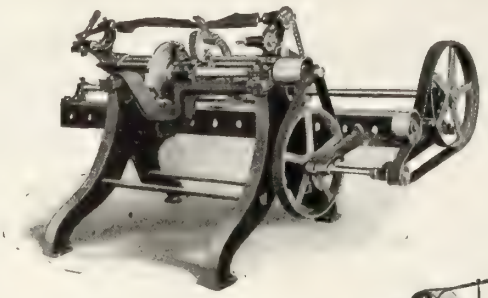
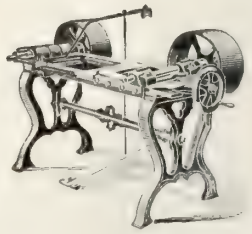
J. M. NASH, Milwaukee, Wis.





Lathes, Sanders, Rip Saws, Cut Off Saws, Bolting Saws, etc.

for turning Handles of various kinds, Whiffletrees, Neck Yokes, Spokes, Ball Bats, Spindles and Variety Work.

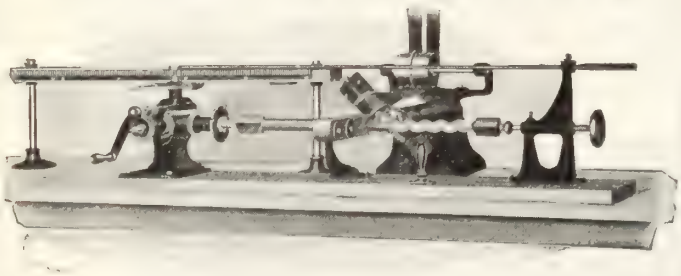
START A BUSINESS OF YOUR OWN

The OBER line of Handle Machinery will help you Easy to operate, moderate in cost, strong, durable.

Write for free information and catalogue No. 31.

THE OBER MFG. COMPANY
CHAGRIN FALLS, O., U.S.A.

Twist Machine



This machine will produce twist and spiral Columns, Balusters, Table Legs and Pedestals, Chair Posts and Spindles, etc., right and left turn.

The cutter used on this machine is in two parts; the cutting edges on each half are milled angular, giving a shear-cut effect.

The dividing plates will space 2, 3, 4, 6 and 8-in. Special plates furnished on application.

The feed gear set gives one turn in 1½, 3, 4½, 6, 7½ and 9-in.

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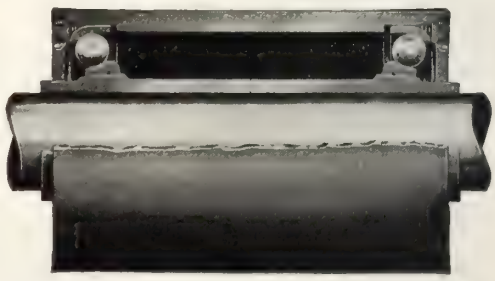
The Shawver Company
Springfield, Ohio



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when installed with

CHAPMAN BALL BEARING LOOSE PULLEYS

A little vaseline **once a year** is all the **attention** and **lubrication** required.

Our loose Pulleys cannot run hot and do not cut the shaft.

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Successor to Cincinnati Branch of The Prendergast Co.

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Cincinnati, Ohio

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Long Leaf Yellow Pine Timbers

OAK
3 cars 4/4 1s and 2s
5 " 4/4 No. 1 Common
2 " 2" x 2"-30" Clear
2 " 2½ x 2½ 2-30" "

POPLAR
2 cars 4/4 1s and 2s
3 " 4/4 Select Common
COMPLETE STOCK
5/4, 6/4, 8/4 All Grades

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2 cars 4/4 1s and 2s
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3 " 5/4 S. W.

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Thoroughly Dry and Well Manufactured

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2 cars 4/4 No. 2 Common Plain White Oak.
1 car 4/4 No. 1 Common and Better Plain White Oak. Worm holes no defect.
1 car 6/4 No. 1 Common Plain White Oak.
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1 car 5/5 S. W. Chestnut.
4 cars 6/4 S. W. Chestnut.
1 car 8/4 S. W. Chestnut.
3 cars 4/4 No. 3 Common Chestnut.
1 car 4/4 No. 1 Common and Better Chestnut.
½ car 8/4 No. 1 Common and Better Chestnut.
1 car 4/4 Saps and Select Poplar.
2 cars 4/4 No. 2 Common and Better Poplar.
1 car 5/4 No. 2 Common Poplar.
1 car 6/4 No. 2 Common Poplar.
1 car 4/4 No. 2 Common and Better Birch.

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in carload or less than carload shipments, scientifically cured, perfectly worked, uniform in color and texture.

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Plain and Quartered Red and White Oak, Poplar

Prompt Shipments and High Grades our Hobby. **Mahogany** Let us quote you on your requirements.

The "Canadian Woodworker" Buyers' Directory

For Alphabetical Index see page 8

ABRASIVES
The Carborundum Co., Niagara Falls, N.Y.

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Company, Woodstock, Ont.

BABBITT METALS
Fay & Egan Co., J. A., Cincinnati, Ohio.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass

BAND SAW FILING MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Pryibil Machine Company, P., New York.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Petrie, H. W., Toronto.
Pryibil Machine Co., P., New York City.

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Berlin Machine Works, Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Williams Machinery Co., A. R., Toronto, Ont.

BAND SAW STRETCHERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

BELT LACER
Clipper Belt Lacer Co., Grand Rapids, Mich.

BENCHES
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

BENDING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
McKnight & Son Co., L. G., Gardner, Mass.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.

BLOWERS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

BLOW PIPING
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

BORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Pryibil Machine Co., P., New York.

BOX MAKERS' MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Co., Berlin, Ont.
St. Paul Machinery Manufacturing Co., St. Paul, Minn.
Whitney & Son, Baxter D., Winchendon, Mass.

BRUSHES
Meakins & Sons, Hamilton.

CABINET PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Co., P., New York City.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Curtis Machinery Corporation, Jamestown, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.

CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
Palmer & Sons, A. E., Owosso, Mich.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Curtis Machine Corporation, Jamestown, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.

COMBINATION WOODWORKER
Hutchison Woodworker Co., Toronto, Ont.

COOPERAGE STOCK
Sutherland-Innes Co., Chatham, Ont.

CUT-OFF SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Knechtel Bros., Limited, Southampton, Ont.
Ober Mfg. Co., Chagrin Falls, Ohio.
Pryibil Machine Co., New York.
Simonds Canada Saw Co., Montreal, Que.

CUTTER HEADS
Berlin Machine Works, Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

DADO HEADS
Elliott, W. A., Toronto.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

DOVETAILING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

DOWEL MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.

DOWELS
Knechtel Bros., Limited, Southampton, Ont.

DRY KILNS
Andrew Co., A. H., Chicago, Ill.
Grand Rapids Veneer Works, Grand Rapids, Mich.
Morton Dry Kiln Co., Chicago, Ill.
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

DUST COLLECTORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

EDGERS (Single Saw)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

EXHAUST FANS
Invincible Blow Pipe Company, Toronto.
Sheldons Limited, Galt, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Whitney & Son, Baxter D., Winchendon, Mass

FILLERS
German-American Stain Co., Grand Rapids, Mich.
Marietta Paint & Color Co., Marietta, Ohio.
Schmidt Co., Walter K., Grand Rapids, Mich.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

FLUTING AND TWIST MACHINE
Pryibil Machine Company, P., New York.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.
Delany & Pettit, Limited, Toronto, Ont.

GRAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto, Ont.

GLUE
Coignet Chemical Product Co., New York, N.Y.
Delany & Pettit, Limited, Toronto, Ont.
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
Palmer & Sons, E., Owosso, Mich.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.

GLUE JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio

GLUE ROOM EQUIPMENT
Boomer & Boschert Company, Montreal, Que.
Perrin & Company, W. R., Toronto, Ont.

GLUING CAMP CARRIERS
Billstrom, Nels. J., Rockford, Ill.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

GUARDS (Saw)
Pryibil Machine Company, P., New York.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HARDWARE SPECIALTIES
Reflector & Hardware Mfg. Co., Chicago, Ill.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

HANDLE & SPOKE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Co., Sandusky, Ohio.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitby & Son, Baxter D., Winchendon, Mass.

HARDWOOD LUMBER
Archer Lumber Co., Helena, Ark.
Atlantic Lumber Company, Toronto.
Duhlmeier Bros., Cincinnati, Ohio.
Imperial Lumber Company, Columbus, Ohio.
Kosse, Shoe & Schleyer, Cincinnati, Ohio.
Kraetzer-Cured Lumber Co., Moorehead, Miss.
Luehrmann Hardwood Lumber Co., St. Louis, Mo.
Mowbray & Robinson, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Powell Myers Lumber Co., South Bend, Ind.
Prendergast Company, Cincinnati, Ohio.
Shiels & Company, Chas. F., Cincinnati, Ohio.
Spencer, C. A., Montreal, Que.
Wilcox & Knapp, Conneautville, Pa.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Black Bros. Machinery Co., Mendota, Ill.
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Knechtel Bros., Limited, Southampton, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.

KNIVES (Planer and others)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Galt Knife Company, Galt, Ont.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

MACHINE KNIVES
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MITRE MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

MITRE SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Co., Montreal, P.Q.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MOULDINGS
Knechtel Bros., Limited, Southampton, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.

PAINTS & VARNISHES
Marietta Paint & Color Co., Marietta, Ohio.

PATENT SOLICITORS
Dennison, H. J. S., Toronto, Ont.
Lightfoot, Stanley, Toronto, Ont.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shimer & Sons, Samuel J., Galt, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

PRESSES (Veneer)
Black Bros. Machinery Co., Mendota, Ill.
Perrin & Co., Wm. R., Toronto, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

RESAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

RIM AND FELLOE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

RUBBING MACHINES
Curtis Machine Corporation, Jamestown, N.Y.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Black Bros. Machinery Co., Mendota, Ill.
Curtis Machine Corporation, Jamestown, N.Y.
Duplex Moulding Sander Co., Hornell, N.Y.
Elliot Woodworker Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SASH, DOOR & BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Shimer & Sons, Samuel J., Galt, Ont.

SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SAW GUARDS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Pryibil Machine Company, P., New York.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Knechtel Bros., Limited, Southampton, Ont.
Pryibil Machine Company, P., New York.

SAW JOINTERS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SCRAPING MACHINES
Whitney & Sons, Baxter D., Winchendon, Mass.

SCROLL SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.
Simonds Canada Saw Co., Montreal, P.Q.

SECOND-HAND MACHINERY
Pryibil Machine Company, P., New York.
Williams Machinery Co., A. R., Toronto, Ont.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pyribil Machine Co., P., New York.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Invincible Blow Pipe Company, Toronto, Ont.
Sheldons Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.

SPRAYING APPARATUS
De Vilbiss Mfg. Co., Toledo, Ohio.

STAINS
Marietta Paint & Color Co., Marietta, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass.

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STORE FIXTURES & FITTINGS
Reflector & Hardware Specialty Mfg. Company, Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

TABLE SLIDES AND TOPS
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

TRUCKS
Standard Dry Kiln Co., Indianapolis, Ind.
Sheldons Limited, Galt, Ont.

TURNINGS
Knechtel Bros., Limited, Southampton, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Whitney & Sons, Baxter D., Winchendon, Mass.

UNDER-CUT SELF-FEEDING FACE PLANER
Fay & Egan C., J. A., Cincinnati, Ohio.

UNIVERSAL WOODWORKING PLANER
Elliot, W. A., Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

VARNISH SPRAYER
De Vilbiss Mfg. Co., Toledo, Ohio.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

VENEERS
Central Veneer Co., Huntington, W. Virginia.
Cincinnati Veneer Company, Cincinnati, Ohio.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Dupre & Company, C., Toronto, Ont.
Evansville Veneer Co., Evansville, Ind.
Goshen Veneer Company, Goshen, Ind.
Haughton Veneer Company, Chicago, Ill.
Hoffman Bros. Company, Fort Wayne, Ind.
Huddleston-Marsh Lumber Co., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Strong Veneer Company, Jamestown, N.Y.
Waetjen & Co., Geo. L., Milwaukee, Wis.
Whisler, C. L., Hillsboro,' Ohio.
Wisconsin Seating Co., New London, Wis.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Black Bros. Machinery Co., Mendota, Ill.
Canadian Boomer-Boschart Co., Montreal, Que.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

WOOD FINISHES
Marietta Paint & Color Co., Marietta, Ohio.

WOOD TURNING MACHINERY
Berlin Machine Works, Ltd., Beloit, Wis.
Shawver Co., Springfield, Ohio..

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Jackson, Cochrane & Co., Berlin, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

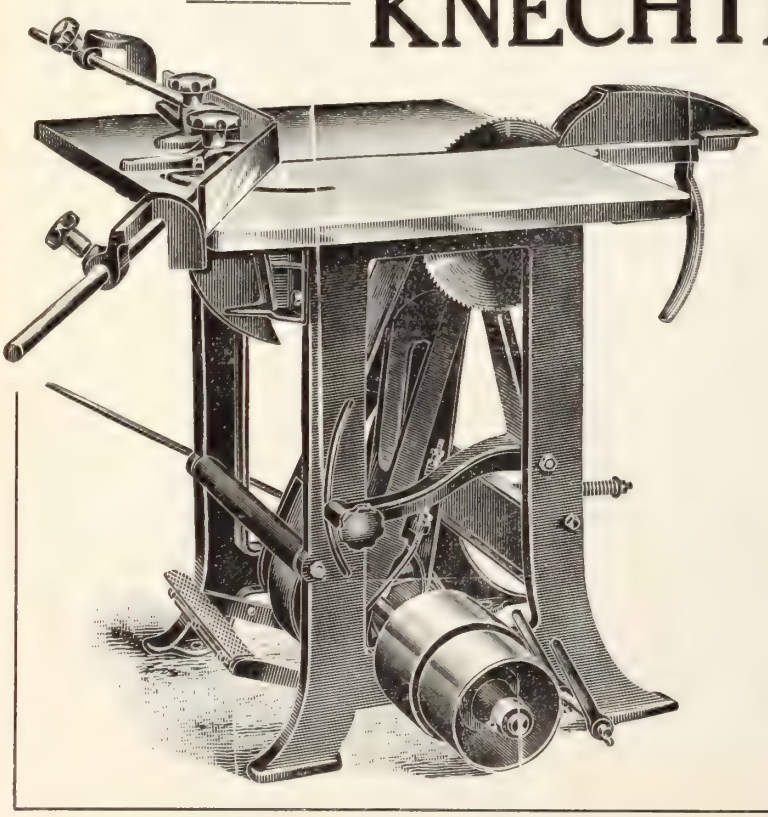
WOOD SCREWS
Robertson & Company, P. L., Milton, Ont.

WOOD SPECIALTIES
Knechtel Bros., Limited, Southampton, Ont.

WOODWORKING CUTTERS
Galt Knife Company, Galt, Ont.

YELLOW PINE
Prendergast Company, Cincinnati, Ohio.

KNECHTEL'S



LIGHTNING CUT-OFF SAW

A few of the special features of this machine:—

Semi-automatic feed which is easily controlled by the operator;
Self-oiling bearings in which the saw mandrill runs;
Adjustable saw-guard which can be instantly shortened when cutting narrow material;
Adjustable gauges to cut various angles up to 45 degrees;
Tight and loose pulleys, 8 inch diameter by 4½ inch face;
Twelve inch saw with 18 inch cut;
Strong substantial frame with the entire machine self-contained.

Write for prices and information.

KNECHTEL BROS.
LIMITED
SOUTHAMPTON, ONT.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively.

Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.

Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

MADE BY

B. Walter & Company

Wabash, Ind.

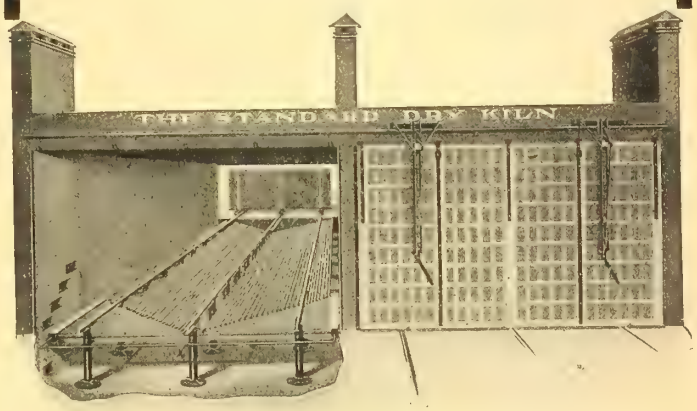
The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887

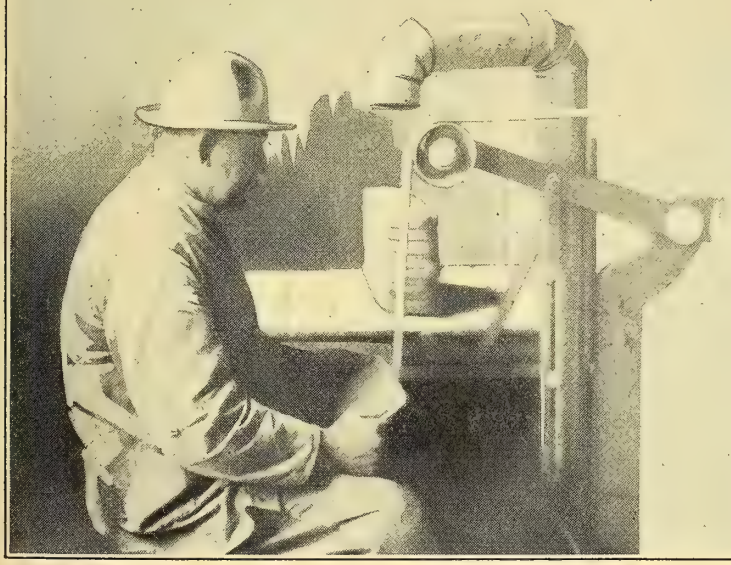
The Standard Dry Kiln

is the nearest approach, in process and in **results**, to Nature's own method. It might astonish you to see in what splendid condition hardwood lumber leaves this kiln.

If you're not near a Standard Dry Kiln, just write to any user for the facts. We have a List of Users that we'll be glad to send you with our catalog. Address: The Standard Dry Kiln Company, 1560 McCarty Street, Indianapolis, Ind.



MAKING A GOOD SANDER A BETTER SANDER



The better the quality of the paper or cloth that you use—the faster and cleaner it cuts—the longer it lasts, the more efficient will be the sanding machine.

Carborundum Brand Garnet Paper and Cloth

Cut clean and fast—they are uniformly coated with the purest, sharpest of garnet grain.—They are products that make a good sander a better sander.

Working Samples on request

The Carborundum Company

NIAGARA FALLS, N. Y.

BOSTON NEW YORK PHILADELPHIA PITTSBURGH CLEVELAND CINCINNATI GRAND RAPIDS CHICAGO MILWAUKEE MANCHESTER, ENG. REISHOLZ, GER.

Marietta Means Practical

THE final test of a finish is the test of actual service—in the home, in the office—wherever furniture is used, or woodwork of any kind.

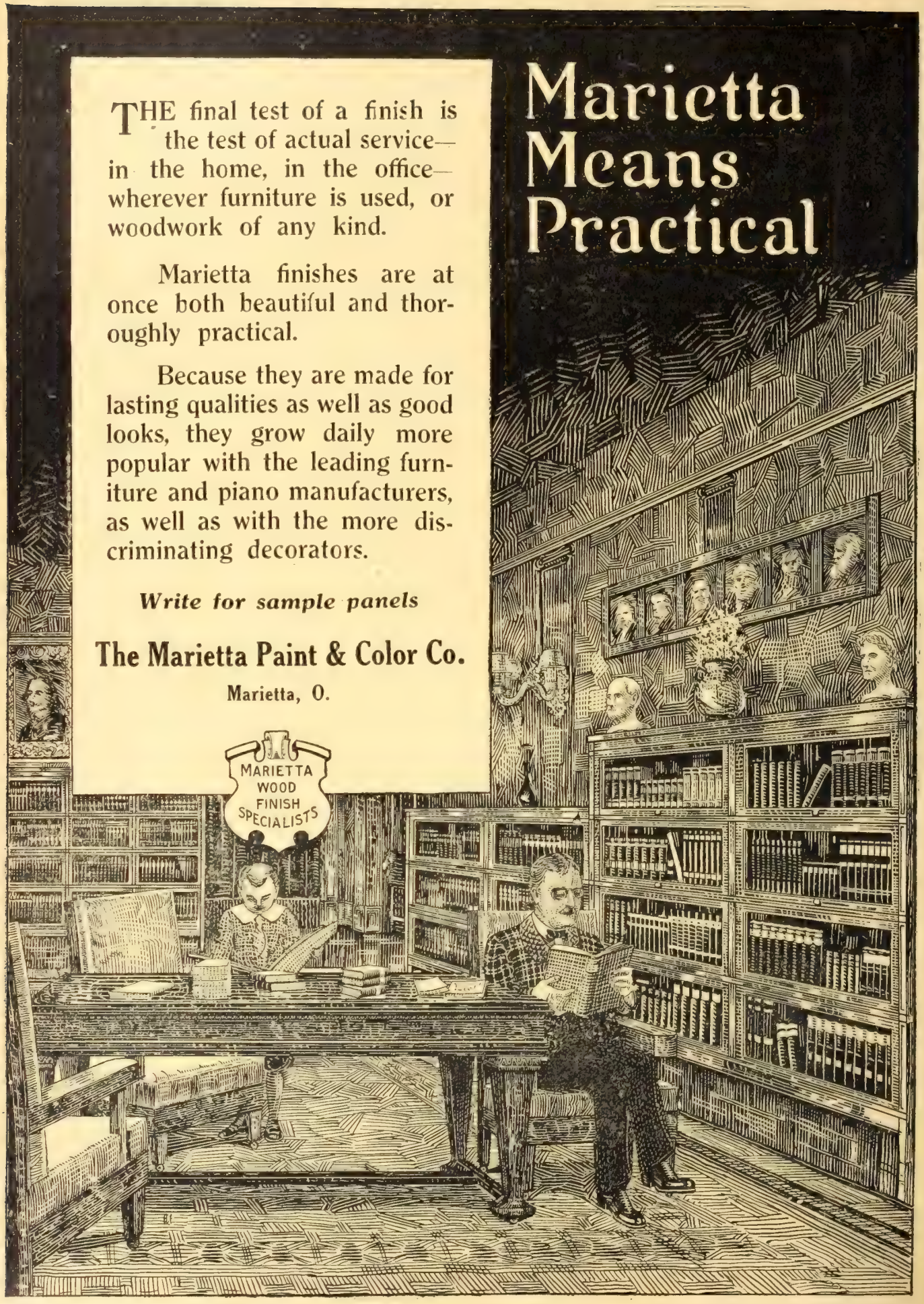
Marietta finishes are at once both beautiful and thoroughly practical.

Because they are made for lasting qualities as well as good looks, they grow daily more popular with the leading furniture and piano manufacturers, as well as with the more discriminating decorators.

Write for sample panels

The Marietta Paint & Color Co.

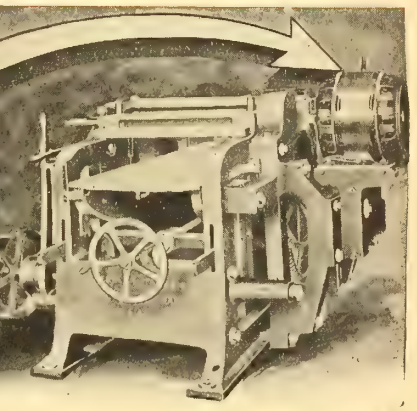
Marietta, O.

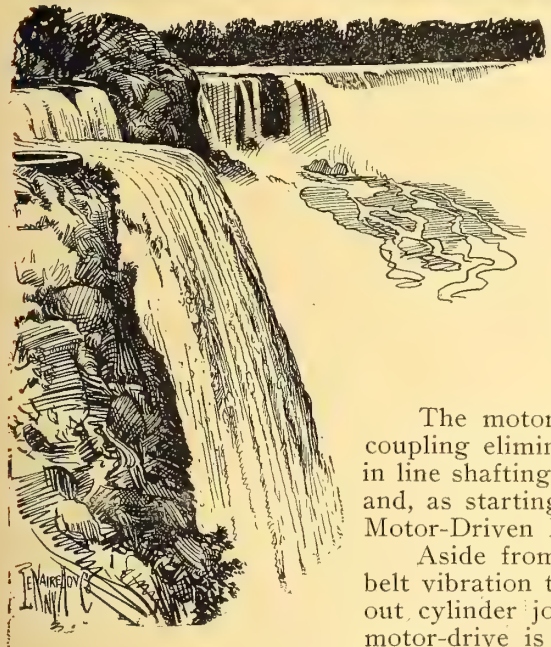


Volume Fifteen TORONTO, AUGUST, 1915 Number Eight

CANADIAN
WOODWORKER
and
Furniture Manufacturer

The Drive that Saves Power





25% of the power you use in driving a planer can be saved by installing

A Whitney Motor-Driven Single or Double Surface Planer

The motor is connected directly to the cylinder by a perfect flexible coupling eliminating belt slip and the great loss of power through friction in line shafting and countershafts. The power is applied where it is wanted and, as starting and stopping is easy, power cost stops when the Whitney Motor-Driven Planer is not actually producing.

Aside from lower operating cost, the results are better. There is no belt vibration to contend with, no belt pull to spring the cylinder and wear out cylinder journals and boxes. The surfacing done on a Whitney with motor-drive is smoother and more uniform than any belted-type machine can do.

A word or two on a postal to us will bring you complete information. We will suggest, if you like, an equipment of square cylinders with two or four knives or round cylinders carrying four thin, high-speed steel knives, sectional rolls and steel sectional chip breakers or flexible steel chip breakers and other features that make Whitney Planers particularly adaptable to your planing. WRITE.

Baxter D. Whitney & Son, Winchendon, Mass.

California Office: Berkeley, California.
H. W. Petrie, Ltd., Canadian Agents, Toronto, Ont.

Selling Representatives: Henry Kelly & Co.
26 Pall Mall, Manchester, England

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"Leather like gold has no substitute."

No Power Leaks

FROM

"CROWN" Planer Belting

The big expense in your plant is the power, so when you have spent your good money to generate it, don't make the common mistake of buying a cheap, inefficient belt to transmit it.

Use "Crown" Planer Belting and you will find it grips the pulleys and transmits 100% of your power. It is made for high speed heavy duty and will take short bends over small pulleys without starting any laps.

We have been manufacturing leather belting since 1876.

Send us an order for one belt.

Made in Canada

Sadler & Haworth

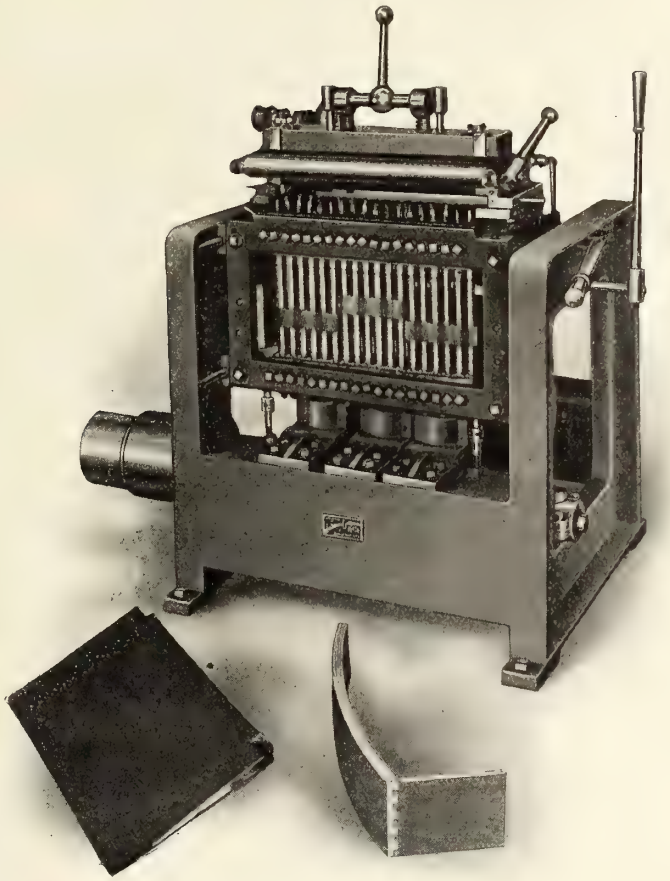
Tanners and Manufacturers

Toronto	St. John, N.B.	MONTREAL	Winnipeg	Vancouver
38 Wellington St. E.	149 Prince William St.	511 William St.	Galt Building	217 Columbia Ave.

Gang Dovetailer

The Best Machine Yet Produced For Dovetailing Ammunition Boxes

The Illustration shows our No. 90 Gang Dovetailing Machine for making swell fronts, straight work or box joints.



We also manufacture a special two spindle boring machine and clamp for use in making shell boxes.

Our No. 90 gang dovetailer can be made to do either the closed end drawer joint or the open end box joint by a very slight and inexpensive alteration.

The machine is sturdily built with a strong and well proportioned frame. The only belt used is that from the line shaft to the driving pulley. Transmission within the machine is by means of silently running cut gears. This arrangement reduces the floor space usually required by dovetailers by two-thirds.

Many of these machines have been installed during the past three years and are giving complete satisfaction.

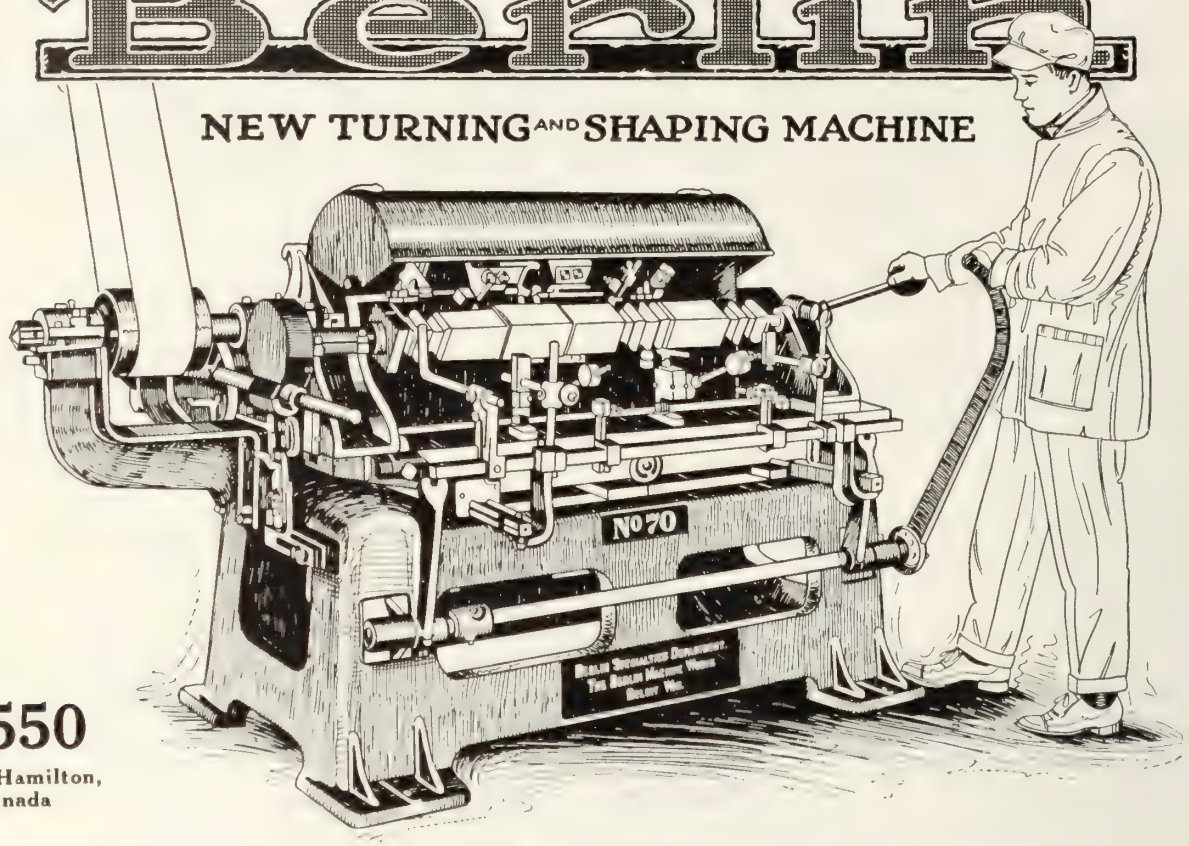
Have you our bulletins?

Jackson, Cochrane & Co.

Berlin, Canada

Berlin

NEW TURNING AND SHAPING MACHINE



$550
F.O.B. Hamilton, Canada

Now Everyone Can Afford This Low-cost Producer of Turned Work

Simplicity of design and construction, incomparable manufacturing facilities and quantity production make possible this sensational announcement—*the first to advertise price.*

RIGHT now when furniture men are looking to economy in making Period patterns, comes this startling announcement, solving manufacturing problems by shaping and turning at but a fraction of hand-lathe, bandsaw and shaper methods.

Heretofore, only those furniture plants with large production and patterns particularly suited to be made on this type of machine, derived the benefits. Medium and small-sized plants could not afford the investment.

Now every maker of turned work, EVEN THOUGH HE USE THE MACHINE ONLY ONE DAY A WEEK, can manufacture at an advantage comparatively equal to that of the biggest and best furniture builders.

The best brains coupled with more than ordinary engineering skill acquired through EXPERIENCE OF NEARLY TWO SCORE YEARS in building machinery for working wood, and remarkable forethought as to the requirements of furniture manufacture have been applied in building this new tool. No other machine builder with less experience could have accomplished this.

No feature is in any way experimental. Nothing has been left undone. This model "70" is the LAST WORD IN TURNING MACHINERY. It represents the highest development and refinement in this line.

It does not present any radical change in working principle but applies HAND CHISEL SHAPING WITH MACHINE SPEED AND ACCURACY.

Built in several sizes or models to meet practically every condition.

Deliveries Now Being Made.

Full details and information about new Selling Plan sent on request.

Berlin Machine Works, Limited
Hamilton, Ontario

MADE RIGHT — RIGHT IN CANADA

WHAT DOUBLE CUT-OFF SAW?

FOR FURNITURE MAKERS?

FOR THE TRUNK MANUFACTURER?

FOR TOY FACTORIES?

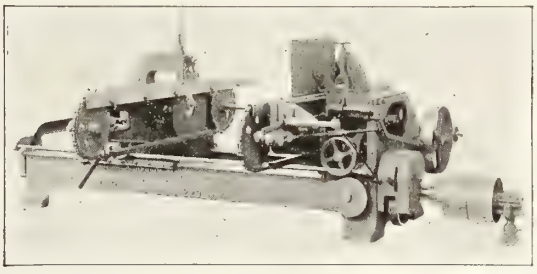
FOR REFRIGERATOR CONCERNS?

FOR THE BOX FACTORY?

FOR SASH AND DOOR WORK?

FOR MAKERS OF CHURCH FIXTURES?

BERLIN



A New Machine

A Better Method

Saves Half Your Present Costs

and assures such accuracy that you'll never have retrimming expense. We have facts that will prove this to you beyond a doubt. They're yours for the asking—free and without obligation.

Will You Give Us the Chance to Prove Up?

BERLIN MACHINE WORKS, LTD.

Largest Manufacturers of Woodworking Machinery in the World

HAMILTON, ONTARIO

U. S. Plant with Offices:—BELOIT, WIS.

MADE RIGHT—RIGHT IN CANADA

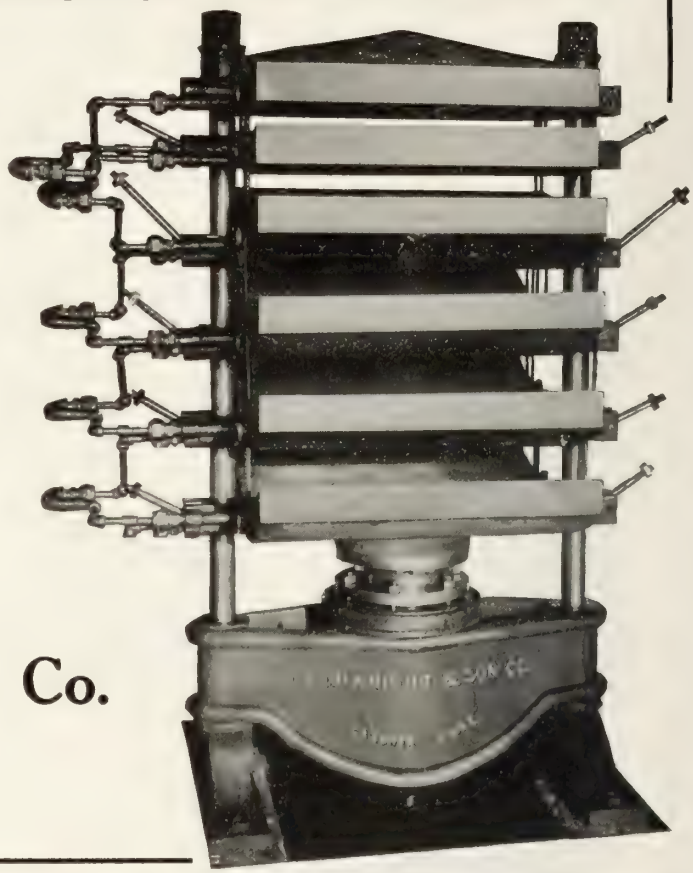
Berlin

McKnight's No. 101, Five Opening Hydraulic Back Bender

THIS cut shows only one of the number of Benders we manufacture for bending different parts of chairs. We manufacture machines for bending backs, back posts, front legs, on either round or square post chairs, and rockers for same.

We also manufacture a complete line of Benders for handle factories, for round handles for pitchforks or shovel handles.

Prices and full particulars on our complete line of woodworking machinery given on application.



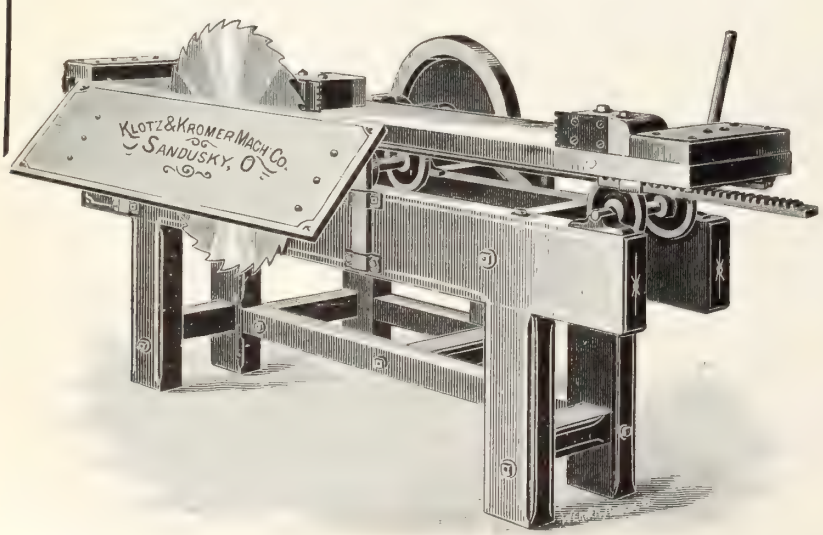
L. G. McKnight & Son Co.

Main Street

Gardner, Mass.

Here It Is!

The Shaping Saw Machine That Saves Time



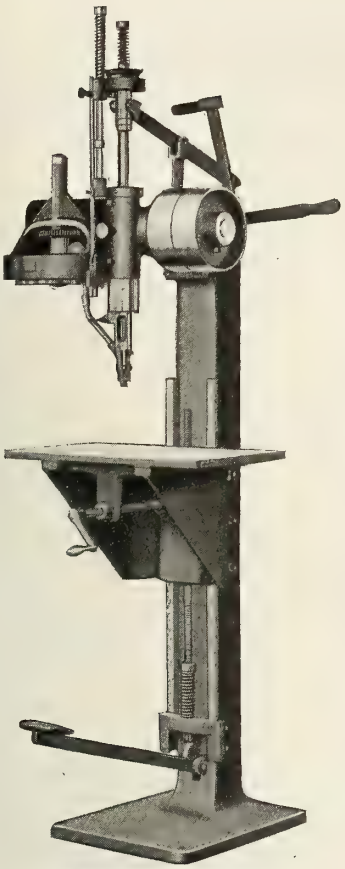
THE Klotz Shaping Saw Machine is specially made and designed for cutting out Shapes or Blanks for Handles, Spokes and similar work, from planks or slabs after they are cut from the log.

The frame is made from hard wood and firmly bolted together. The table is made of well-seasoned ash strips, glued together, and runs on large turned rolls, with wrought iron axles and metal bearing. A chuck is attached to the table for holding the timber; the same is adjustable for different lengths of work, and is very quickly operated by a suitable handle. The mandrel is of steel, and the balance-wheel is turned so as to run perfectly true. The drop-table is arranged so that it may be easily lifted out of position, in order to get at nut on mandrel to take off the saw. The saw furnished with the machine is 26 inches in diameter, and pulley on mandrel is 8 inch diameter, 6½ inch face, and will make about 1400 revolutions per minute. Power required, 2 H.P. Shipping weight 900 lbs. Floor space 4 x 7 feet.

Write us for prices and details.

Klotz Machine Co.

Sandusky, Ohio



No. 2 Standard Type Automatic Screw-Driving Machine.

The Only Way to Drive Screws

There is a stage-coach method and a modern method of doing everything. When it comes to driving screws the only modern way is with an Automatic Screw Driving Machine, which means greater and better production and greater profit.

The Reynolds Automatic Screw-Driving Machine

is guaranteed to produce results. It is no experiment. The No. 2 Standard Type, shown herewith, is particularly suited for placing the screws in the straps of shrapnel boxes. It may be fitted to drive, without change or adjustment, any three consecutive sizes flat or round head, or two sizes filister head, No. 6 to 14 inclusive, wood or machine screws, or three sizes flat or round head, or two sizes filister head machine screws up to No. 20. All the above up to 1½ inches long if smaller than No. 10, or up to 1¾ inches long, No. 10 or larger. Fitted with boring attachment if desired.

Many Machines in Use in Canada.

Ask for our Catalogue.

REYNOLDS PATTERN & MACHINE CO.

101 and 103 Third Ave., Moline, Ill., U.S.A.

Are Your Products Perkins Glued?

Ladies' Desk manufactured by The Berlin Furniture Co., Berlin, Ont., in which Perkins Glue was used.

THE live dealer realizes the value of selling his customers Perkins Glued products because they never come apart. Many of Canada's largest furniture factories use Perkins Vegetable Glue. It costs 20% less than hide glue, is applied cold, antiquating the obnoxious and wasteful cooking process, is absolutely uniform in quality and will not blister in sanding.

We will be glad to demonstrate in your own factory and on your own stock what can be accomplished with Perkins Vegetable Glue.

Write us to-day for more detailed information.

Perkins Glue Co.

South Bend, Ind.

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BOOKS FOR SALE

The following books are offered at special prices subject to previous sale:

Carpentry and Joinery, by Gilbert Townsend. Published in 1913 by the American School of Correspondence. 258 pages, illustrated. Price $1.00.

Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

The Book of Lumber Shed Construction, by Met. L. Saley. Published by American Lumberman, Chicago. 176 pages, illustrated. Price $1.00.

Popular Mechanics Shop Notes, Published by Popular Mechanics, Chicago. Easy Ways to do Hard Things, etc. Years 1905-1906-1907-1908. Price 40c. each.

Cabinet Making, by J. H. Rudd.. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Guide & Assistant for Carpenters & Mechanics, by H. G. Richey, Published by William T. Comstock. 177 pages, illustrated. Price 50 cents.

Woodworker Publishing Company, Limited

345 Adelaide Street West, Toronto, Ontario

GRAND RAPIDS VAPOR KILN

Experience

It required a big woodworking plant, plenty of money, and years of time to develop our efficient vapor kiln. We have made the best use of all our facilities.

We don't experiment with our customers as every other dry kiln manufacturer is compelled to do.

A modern **vapor** kiln is more than pipe and fittings. To secure real drying service and efficiency, you must have a kiln designed for your requirements, efficiently installed in a building properly erected.

The **Grand Rapids Vapor Kiln** is the result of ten years' "hard knocks."

GRAND RAPIDS MICHIGAN

The Atlantic Lumber Co.

Manufacturers and Wholesale Dealers

American and Canadian Hardwood Lumber and Mahogany, Quartered and Plain, White and Red Oak a Specialty.

110 Manning Chambers - **TORONTO**
Phone Main 6386

HOME OFFICE, BOSTON MASS.

Mills: KNOXVILLE, TENN., WALLAND, TENN.
FRANKLIN, VA.

Morehead
Back to Boiler
SYSTEM

Read What The Wabash Cabinet Co. Say!

"With reference to the Morehead Trap, it is everything that Mr. MacLachlan said it was. Before we made this change, our watchman was obliged to put in coal every fifteen minutes. Now he puts in a fire on an average of once every hour and WE ARE SAVING OVER 50 PER CENT ON THE COST OF OUR FUEL.

You can do the same. The first step is to

Write for the "Back-to-Boiler" Book

In it you will find the condensation question discussed from several angles—and interesting pictures of installations under every possible condition.

The economic principle of the "Morehead" System will save you dollars. Write for the book TODAY.

Canadian Morehead Manufacturing Company

WOODSTOCK **Dept. "H"** **ONTARIO**

Chas. F. Luehrmann Hardwood Lumber Co.

148 Carroll Street

ST. LOUIS, MO.

Manufacturers of the original

St. Francis Basin Gum

We have on hand a complete stock of Red Gum and Unselected Gum, in thicknesses from 1″ to 3″. Nice dry stock of 1″ to 2″ Quartered Red Gum.

We also carry a complete stock of Oak, Quartered and Plain, Red and White, 1″ to 5″ thick, and large stocks of Ash, soft Maple, soft Elm, Cypress, Yellow Pine and Cottonwood.

We make a specialty of Yellow Pine Structural Timber, and can furnish either Long Leaf or Short Leaf.

We carry a full and complete stock of all kinds of Veneers, in Red Gum, Mahogany, Oak, Poplar, Yellow Pine and Birch.

Delany & Pettit, Limited

Joint and Veneer Glue

Always uniform.

D AND P QUALITY

Special Woodworking Garnet Paper and Cloth

Ask for Samples and Prices.
You will find us attentive to your interests and zealous in our endeavours to serve you

Office:—133 Jefferson Avenue, TORONTO, ONT.

Works:—105-131 Jefferson Avenue
106-118 Atlantic Avenue

Canadian Woodworker

**A Monthly Publication in the Interest of the Woodworking Industry.
Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.**

Subscription, $1.00 a year; foreign $1.50.

Woodworker Publishing Company, Limited

Branches: Montreal, Vancouver, Chicago, New York, London, Eng.

345 Adelaide St. West, Toronto
Phone Ade. 2700

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Vol. 15 **August, 1915** **No. 8**

Woodworking Industries Nothing to Fear

IT is significant that people no longer make it a matter of vital concern whether the war will last another six months or another six years. The war, with the conditions attendant upon it, is beginning to sink in deeper, and the elementary questions propounded a year ago are giving place to a consideration of the more serious and more practical matter of keeping the bailiff out of the country.

The phenomenal development which this country has witnessed during the last decade has been attributable almost entirely to the ever-increasing stream of immigrants from the Old Country. Almost any western town or city bears out this assertion—Vancouver, the Gateway to the Pacific; Calgary, the cowtown of a decade since; Winnipeg, a generation or so ago little more than a trading post; Edmonton, Saskatoon, and many others. Whether we like it or not, we must consider the hard, cold fact that the stream of immigration is cut off—for the present, at any rate—and that we are now face to face with the situation of holding our own.

It is a gratifying reflection that so far, thanks largely to the enterprise of the manufacturing interests and the extent to which they have been able to cope with emergency war orders, we have been able to hold our own. We find business actually picking up in the manufacturing centres, owing to the receipt of these large war orders from Britain and her allies. Railway earnings have been improving, and with the approach of the crop-moving period the money market has been featured by a gradual strengthening of rates. Canadian woodworking industries have been getting a good deal of business from the Old Country, other manufacturing lines have benefited proportionately, and it is believed that Canada is finding a permanent place in the British market.

There is no doubt whatever that the situation in Canada thus far has been saved by the country's supreme confidence, not only in the Empire, but in itself. Confidence, then, business enterprise, and manufacturing supremacy, are the three pillars upon which the country's prosperity must be stayed during the period of the war.

There are those who, in discussing the prospects of the country upon the termination of hostilities, will point to the millions that have fallen, and to the unprecedented destruction in the ravaged cities of France and Belgium. They will tell you that every mechanic will find a place—and a good place—in Europe, and that the Old World will supersede the New in constructional attraction.

With this we are not in accord. We may be sure that for long enough after the declaration of peace, finances will not be forthcoming for the rebuilding of half the European continent, and that much of the restoration will come about rather as a sort of evolution than as a sudden enterprise. Moreover, in the matter of such principles we may learn much from history. It is a fact that the greatest periods of colonial expansion followed immediately upon the great wars of the eighteenth and nineteenth centuries. There are those of us who can recall the impetus given to immigtation by the Franco-Prussian war, and later by the South African war.

For our own part, we look upon the present troublous time as affording Canada an opportunity of self-examination and preparation. It is a time when all matters appertaining to business administration should be examined into, when loopholes in the various departments of the factory should be detected, and false economies exposed, when machinery should be overhauled and renewed, and when workmen should be trained in especially skilled lines in preparation for the demands that will be made upon them a little later on.

Canada has a great future, and the prospects of the country are enhanced rather than diminished by the losses sustained in the Old World. Constructional enterprise in general, and the woodworking industries in particular, have nothing to fear.

Portable Houses—Canadian Plants Ready

WE have received a number of inquiries regarding a recent press despatch from New York, in which it was stated that an order for twenty thousand portable houses for use in Belgium and France was being negotiated for in New York and was likely to be closed there. The name of a large Brooklyn firm was mentioned, so that quite naturally the heads of leading woodworking industries in Canada became exercised in their minds as to why Canadian plants were being overlooked.

From inquiries we have made we learn that the press report was unfounded. There is no smoke without fire, however, and doubtless there is something on the way which would suggest that Canadian manufac-

turers should be on the alert. Too much emphasis cannot be laid upon the fact that in regard to manufacturing facilities and familiarity with technical details Canada is in a position to handle orders of this kind with as much despatch as the larger factories in the United States. Inquiries indicate that many Canadian plants are able to meet the requirements of such orders, and that a large number of factories having the best possible equipment for such work are not running at anything like full capacity. Many of these quote close prices, and give as good delivery as United States plants.

From a business point of view the buyers of portable houses in England and Europe would be acting in their best interests by getting quotations from Canadian concerns; while from the patriotic viewpoint nothing need be said, having in mind the generous part that Canada is playing in the war.

It is to be hoped that the rumour from New York has put fresh life into the Department of Trade and Commerce at Ottawa, and caused inquiries to be made into the capacity and resources of Canadian plants. It is essentially the duty of this Department to follow up such matters closely, and to be prepared so soon as any such orders are under consideration to advise Canadian manufacturers and give the Government requiring the goods the fullest information about our facilities for supplying them.

An excellent suggestion in the way of a "Clearing House for War Supplies" is contained in a letter from Messrs. Schultz Brothers Company, Limited, who write:

"It seems to us that those mediums through which such orders are placed on behalf of the Imperial Government should, in the first place, ascertain the ability and capacity of Canadian plants before going to American concerns. Our Canadian Manufacturers' Association at the present moment could establish another field of activity besides those they so ably carry on, a sort of Clearing House for War Supplies, through which the various Canadian plants could establish their ability to handle war orders and through which the Government could ascertain what kind of orders our Canadian manufacturers could handle. For certainly our Canadian loyalty to the Empire entitles us to that consideration, the more especially as we should handle such orders not merely for the money consideration, but with that special attention which our patriotism and loyalty inspire. And such a clearing house would be free from baneful political influences."

Without some such clearing house establishment it is inevitable that many orders will be placed to the disadvantage of those who are making the purchase and of firms which could handle them. It has been suggested that our manufacturers have not been as wide-awake to their opportunities for business as they might have been, and that much good business could have been secured with a more energetic policy in effect. The most certain way in which to remove such a criticism is to establish some system of collecting information about Canadian productive capacity, and it is to be hoped that something will be done in this direction without delay.

There is not only business in taking enterprising measures in such a case as this, but there is patriotism —for the reason that the securing of such large contracts, even on a very close figure, does much to maintain the stability of the country and banish the spectre of unemployment and distress.

The war has brought a considerable amount of extra business to Canadian woodworking plants, but it cannot be denied that with the approach of fall and winter the distribution of an order on anything like the scale rumoured in the press despatch would be a godsend.

Workmen's Compensation in British Columbia

A Workmen's Compensation Act has been introduced in the Legislature of the province of British Columbia. The proposed act is of a compulsory nature embracing all occupations under the administration of the Government. Two schedules of occupation are provided, schedule one embracing all occupations arranged in classes according to their hazard, with the exception of railways, telephone lines, steam vessels when owned and operated by railroads, or express companies similarly owned or operated, which are included in schedule 2. In connection with schedule two, the employers are liable for compensation both in the construction and operating departments. The manner of carrying insurance, method of payment, etc., under schedule two are to be supervised by the Workmen's Compensation Board, consisting of one commissioner holding office for ten years, whose findings are not subject to revision by any court. The administration of the act is virtually within the power of the Board. An assessment on the various classes is to be made prior to the application of the Act to such extent as the Board deems sufficient. Compensation is paid from the sum total of the accident fund, if the amount in a certain class falls short. Each year the Board makes an assessment based on the experience of the preceding year. The accounts of the Board are to be audited by the auditor-general reporting to the Lieutenant-Governor.

In case of death from injury or industrial disease the board pays (1) burial expenses up to $75; (2) to widow, monthly payment of $20; (3) for each child under 16 years $5, the total amount not to exceed $40. Should the widow marry she is entitled to a lump sum equal to two years' payments to be paid within a month after her marriage.

In case of permanent total disability, payment of 55 per cent. of the weekly earnings of the employee is made during life.

In case of permanent partial disability the difference in earning capacity governs the amount of award.

In temporary total or partial disability the awards are made during the time of disability. A waiting period of 14 days is provided in all injuries. Should the employee be incapacitated a longer time than 14 days, compensation is paid from the time of the disability.

"Presumptions" of interest are found in Part I, Section 3 (2) which says: "Where the accident arose out of the employment, unless the contrary is shown, it shall be presumed that it occurred in the course of the employment, and where the accident occurred in the course of the employment, unless the contrary is shown, it shall be presumed that it arose out of the employment.

The inherent risk of the industry and the negligence of a fellow servant are not a bar to securing compensation by a workman operating under Schedule 2, but contributory negligence shall be taken into account in assessing damages in an action taken by the workman under the "Families Compensation' Act."

Stratford, Ont.—A City of Versatile Woodworking Interests

IN the following pages we feature the leading woodworking industries of the city of Stratford—one of the leading centres of the industry in a province whose products in this line of endeavor are known from one end of the Dominion to the other. In the preparation of our descriptive notes an effort has been made to concentrate on matters of essentially practical rather than generally informative interest, and for this reason special attention is devoted to manufacturing methods and equipment.

It may be of interest to direct attention to the wide range of manufacture covered in the operation of the Stratford plants. The varied products progress through the reed, rattan, and upholstered furniture of the Imperial Rattan Company, through the extensive lines of chairs made by the Stratford Chair Company, the miscellaneous folding articles seen at the Stratford Manufacturing Company's plant, to the high-grade lines turned out by Classic Furniture, Limited, and The George McLagan Furniture Company, Limited.

The city of Stratford is a conspicuous example of the growing importance of the woodworking industries in Ontario's smaller cities.

"Everything That Will Fold Up"—The Varied Products of The Stratford Manufacturing Company, Limited

ONE of Stratford's youngest but none the less enterprising woodworking industries is The Stratford Manufacturing Company, Limited. To describe their output briefly, one may say that it includes practically every kind of wooden article that will fold up: lawn swings, clothes driers, ironing and bake boards, folding chairs and tables, park seats, lawn and verandah furniture, and kitchen cabinets, besides their well-known line of step and extension ladders.

Only the best grades of clear yellow pine are used for the manufacture of the step-ladders and the sides of the straight and extension ladders. For the rounds of the straight ladders, rock elm is used. For the various chairs and seats, swings, and other smaller articles, beech is used in large quantities, with basswood where hardwood is not required.

The plant has only been in operation about seven years, but in that time considerable extensions have been made, and the firm has plans in hand at the present time for still further development. In order to give an idea of the arrangement of the equipment of the plant we give herewith a couple of sketches. The smaller of these shows the second floor of the part of the plant which is built in two storeys. The rest of the factory is just one storey, the whole being of brick construction, with concrete floors.

The main part of the factory of the first floor is devoted to the machine operations. The machinery equipment is very complete, and includes a number of machines which have been built by the company specially for their own work.

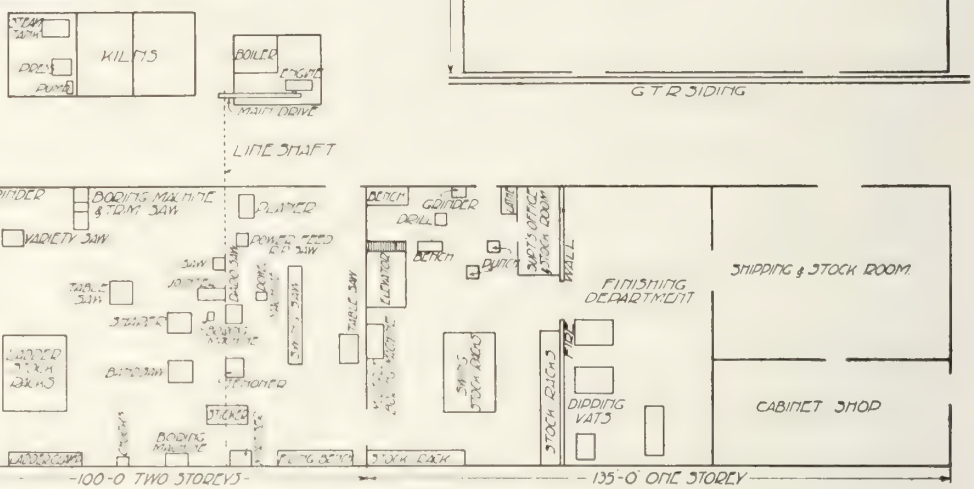
The machines which prepare the wood for detail operations include a Badger State power-feed ripsaw and a Cowan single surfacer, with sectional feed roll and chip breaker. Several special appliances have been developed in the factory to facilitate the manufacture of their long ladders. Among these may be noted a long power-operated clamp for assembling these ladders, a special boring machine for making rivet holes for the ladder locks, a chucking machine with four spindles for sizing the ends of the rounds to fit various sized holes, and a bending apparatus which bends the ladder while the wires are being put on the sides. This bending of the ladder enables the side wires to be made very tight, since the distance between the end pins to which the wire is attached is nearly half an inch shorter when a ladder is bent, and thus, when the wire is fixed with the ladder in this position, it is made absolutely tight when the ladder is allowed to straighten out.

The press for assembling ladders is operated by six screws, driven by bevel gearing and a reversible friction drive. The friction drive is controlled by means of cords, and pull cords are attached to the overhead cords at three different points, so that the man operating the press may stand at either end or near the middle, and be able to control its operation without changing his position. The press has plenty of power, and when operated for the edification of The Canadian Woodworker it easily crushed a hardwood ladder round.

The chucking machine has four spindles, and by the use of interchangeable heads it is possible to finish the ends of three different sizes of ladder rounds and to round the ends without having to alter the machine. A number of standard machines are in use in connection with the manufacture of the swings, seats, and kitchen cabinets, including sticker, tenoner, and jointer, by Cowan, a West Side band saw, Houston mortiser, and a Clement gauge lathe.

Two particularly interesting machines are an Advance 2-spindle shaper, and a Hawker dowel machine with adjustable head, the latter supplied by the Hawker Manufacturing Company, of Dayton, Ohio. The shaper has ball bearings, and the spindles are driven through friction gearing, which eliminates the use of quarter twist belts on the spindles. Instead, a single belt is run from the usual floor countershaft to the horizontal shaft of the friction gearing, each spindle being driven from the horizontal shaft by cones. The spindles are started and stopped independently by levers at the front of the machine. Power saving in the use of ball bearings is evidenced by the time for which the spindles will run after power has been shut

Plant of The Stratford Manufacturing Company, Limited



A view of the Stratford Manufacturing Company's plant is shown above; the layout, which reveals an excellent disposition of the machinery and equipment, is the Ground Floor Plan.

off. The same thing is shown in a more practical way by the manner in which this machine will handle heavy cuts in hardwood without stopping or slowing up, although it may be mentioned that the belt now used on this machine to drive the horizontal shaft of the friction gear—and through it both of the spindles—is one of the pair which formerly drove directly on the spindles of an older type machine. Most of the work is to standard shape. Solid cutters are employed, saving time in setting, and guaranteeing that the shapes turned out will always be the same. The firm have followed out a consistent policy of using heavy forms for their shaper work. Most of those in use are built up to a thickness of from two to three inches from ordinary drawer-bottom stock glued up in several plies. This, of course, guards against any possibility of warping. As the shaper is well able to handle heavy cuts without slowing up or stopping, a great deal of the bandsawing is eliminated. For instance, in making small blocks with ogee ends, the blocks are not bandsawed to shape before having the edges rounded and smoothed on the shaper. The blocks go to the shaper in the square, and the cutters remove the surplus wood, and leave the ends smooth without any trouble, although most of the cut is across the end grain,—a particularly difficult cut in shaper work, especially when using solid cutters on hardwood.

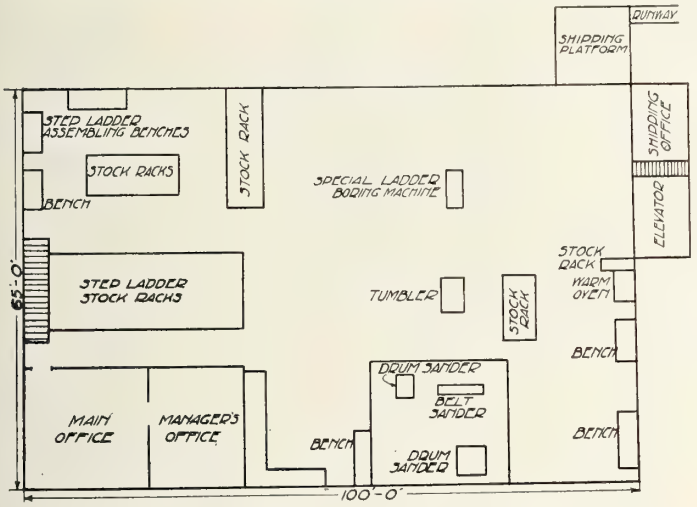
The Hawker adjustable dowel machine is doing particularly efficient work in operations which generally run none too smoothly unless the lumber is absolutely perfect. The firm rip up their boards just as they come from yard or kiln, and put them through the dowel machine without any cutting out of knots or squaring of ends. As is well known, the making

"Everything that will fold up."

of dowels is generally pretty difficult when the lumber is at all rough,—knots break up, pointed ends overlap and cause no end of trouble and loss of time, and when a piece does stick it takes anything up to an hour to get it out of the machine. With the Hawker machine, in use by the Stratford Manufacturing Company, stoppages of the stock on its way through the machine are much less frequent, and when they do occur the reverse feed never fails to back out the strip.

Quite a lot of metal work enters into the manufacture of the ladders and seats, and the department is fitted up with two punches and a drill for the making of the metal parts. The finishing room with dipping vats for the different colors of paint and also for varnish and japan for metal work takes up another section of the ground floor, and beyond that is another section containing a cabinet shop where kitchen cabinet work is assembled, and a large room devoted to packing and storage.

Upstairs are most of the benches where step-ladders and chairs are assembled. There are also one or two machines on this floor, including sanders, special ladder boring machine, and tumbling drum for smoothing small wood and metal parts. All the machined



Second floor plan—Stratford Manufacturing Company's plant.

step-ladder stock and a quantity of step-ladders are finished on this floor, and instead of going down in an elevator they are taken out on to a platform at the second floor level and thence down an inclined runway to the cars. A special carrying truck devised by the superintendent of the plant is used to move these step-ladders. By means of the truck four or five ladders can be handled at once without difficulty.

Apart from the main factory building, there is a large shed used for storing lumber and finished goods. Built just on the other side of the railroad siding from the factory, this shed is 112 ft. long, 72 ft. wide, and 20 ft. high, of frame and galvanized iron construction.

The power house containing the engine and boiler is also detached from the factory, thus reducing the fire hazard. In another small building near the boiler house are the dry kilns and bending room. The kilns, which were built by the company, embody the most modern practice in the operation of drying lumber. The bending room has a hydraulic press by Bancroft and Bernard, Gardner, Mass., and a steaming tank. A small oil storage house is located beyond the large storage shed.

Under the direction of Mr. E. Dilmarter, the Superintendent, many of the special machines and devices have been developed. Of course the working out of special rigs of this nature has been greatly facilitated by the presence of one or two metal-working machines. For instance, they have a Clement gauge lathe for their turned work; by means of a comparatively simple arrangement of metal levers the tail centre is pressed against the end of the piece to be turned by a counterweight until the end of the cut is reached, when a trip action draws back the tail centre and allows the finished piece to be taken out by the operator without his having to turn a hand-wheel to release the piece. The tail centre is held back by a catch until another piece is put into the machine, when the operator has merely to release the catch and allow the counterweight to bring the tail centre up to the stock.

The finishing room is equipped with four dipping vats for painting and varnishing the various goods. The vats are long and narrow and about five feet deep, as all the pieces to be finished are flat.

The kitchen cabinet work is done in the cabinet shop shown in the sketch plan at the back of the shipping and packing department.

An interesting piece of work carried out by the Stratford Manufacturing Company was the seating for the Ontario Jockey Club at the Woodbine Race Track at Toronto. The company have worked out the actual quantities of material used on this job. If set end to end in line the seats would reach for a distance of 2¼ miles. There were 33 miles of wood slats used in the seats, with 9¾ miles of steel. In this steel 126,025 holes were punched, and 95,779 rivets were used in the construction of the seats. The whole order required 13 large furniture and automobile cars for shipment, and the work progressed so smoothly that one carload was shipped each day while the order was in process of manufacture. As an instance of the firm's capacity for work it may be said that the entire order was finished within four weeks of the time of delivery of the first car of steel to the factory siding.

Mr. George M. Richardson is President of the company, and Mr. Chas. A. Moore Manager and Secretary-Treasurer.

Belts—goods ones at any rate—do not wear rapidly under steady use. If they are looked after and used properly all belts will give unremitting service. Bad shifting arrangements, careless shifting and improper "doping," all militate against the effective life of belts. Eliminate the first, and much of the trouble due to the second abuse will disappear. The third matter requires special attention, which will fully repay the time taken in increased work from the belts.

It is evident that in the saw mill planning of the future more regard will be shown to power economy than has been the case in the past. Waste utilization is attaining a point where the great surplus of fuel which has marked saw mill operations will have little excuse for existing, and that going to make steam will have a specific value.

In New York City it is proposed to erect a building to be known as the Pan-American Building. If the plans go through, the new structure will put all other sky-scrapers in the shade, as they call for a building over one thousand feet high. The cost is estimated at seventeen million dollars.

The Manufacture of Bed-Davenports by The Farquharson-Gifford Company, Limited

A view of the Farquharson-Gifford Company's factory.

IN a large four-storey factory of brick construction, near the branch line of the G. T. R. which serves the furniture factory district of Stratford, there is carried on one of the more modern developments of the furniture trade—the making of bed-davenports. This article is comparatively an innovation as compared with the great majority of furniture designs, but it is one that has taken a good hold on the market. The Farquharson-Gifford Company have been in business in their factory about two years, and they have developed a wide variety of designs, not only in bed davenports, but also in couches, chairs and other articles of living-room furniture.

So far they have not commenced to do their own machine work, and have not installed any woodworking equipment, but they started out with a thoroughly up-to-date factory building with a detached power house, so that whenever the business is large enough to require it the machinery can be installed to operate with the maximum efficiency.

One end of the first floor is occupied by the office, and the balance of the floor is devoted to packing and preparation of shipments of goods. On the second floor is the upholstering department, and above that on the third floor the finishing of the woodwork is carried out. Part of the third floor is parted off as a photographic studio for the preparation of photographs of the products of the factory for use in catalogues, etc. One end of the top floor also is divided from the rest, being used as a show room and containing samples of all the company's goods, which are pretty numerous and cover about every idea in the way of upholstered living-room furniture, in both leather and tapestry coverings. Lengths of the tapestry cloth are effectively used in this show room as backgrounds for the samples. Not only beauty, but a whole lot of comfort is embodied in the designs of the Farquharson-Gifford Company's chairs and couches.

The various floors are served by a large capacity electrically operated elevator, and each floor is equipped with sprinklers and sanitary drinking fountains. By the inclusion of ample windows in the design of the building, a point that is getting better recognition than it used to, an abundance of natural light is available at all times of the day.

Rattan and Willow Furniture at the Plant of the Imperial Rattan Company, Limited

A full line of rattan and willow furniture, and also a line of over-stuffed upholstered chairs and rockers, is manufactured at the Imperial Rattan Company's factory. A feature of this plant is a show-room 120 feet by 60 feet, in which samples of the entire products, comprising three hundred patterns, are exhibited. This plant has been running continuously on full time since the beginning of the war, with the exception of a week in July.

Rail sidings are convenient to the dry kiln, and lumber is carried from the yard to the kiln and into the factory with one handling. The lumber stays on the trucks, through the dry kilns, and into the cutting room. A chain-fed ripsaw manufactured by Cowan & Company, of Galt, takes care of the dimension stock without much handling. Dowels are made from squares, and the bending is done by a McKnight hydraulic press, supplied by L. G. McKnight & Son Company, Gardner, Mass. A Berlin revolving bed sander, furnished by The Berlin Machine Works, of Beloit, Wis., and Hamilton, Ont., takes care of the flat small stock, and several drum and belt sanders are assigned to the bent stock. The frame machine room contains all the latest boring machines and saws, the equipment being designed to facilitate and expedite the operation of the finishing room.

The finishing room has an up-to-date fuming chamber and other equipment, and is well lighted and ventilated. The reed and willow weaving room is also well lighted, and is fitted out with adjustable benches for the workmen.

The outstanding feature of the operations of this plant is the manner in which the work progresses from one department to the other with the least possible handling. The shipping room is handy for trucking and carloading, and a stock room adjoins the receiving room.

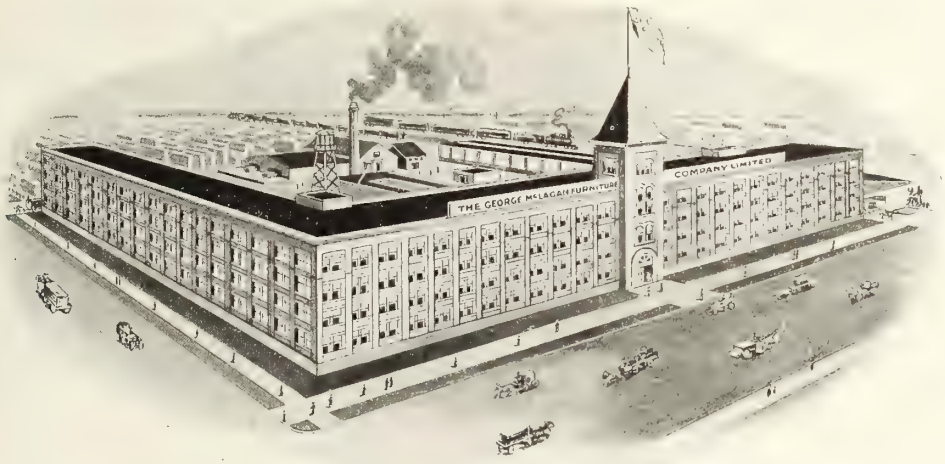
The various woods used are oak, gum, birch, beech, and maple. Electric power is used throughout the plant.

It is perhaps noteworthy that an efficient cost-accounting system, operated in connection with the bookkeeping, provides the firm with a monthly inventory of the exact cost of their products.

The Products of The George McLagan Furniture Company's Fine Plant

THE plant operated by this company is one of the largest and best equipped in Canada. It was first established in Stratford twenty-seven years ago, under the style of Porteous & McLagan. In March, 1900, the old factory was destroyed by fire, and the company was reorganized as The George McLagan Furniture Company, Limited. The erection of the present building followed shortly afterwards. The main factory building is 300 by 50 feet, with a wing 160 by 60 feet, four storeys high, with adjoining boiler and engine houses, a dry kiln with a capacity of 180,000 feet, an extensive dry lumber storage shed, and other out-buildings.

The special lines of manufacture turned out by this firm are dining-room, hall and library furniture, and cabinets, mostly in quarter-cut oak, birch and mahogany. Normally employment is given to nearly four hundred skilled workmen.



"One of the largest and best equipped in Canada"—The George McLagan Furniture Company's plant at Stratford.

The lumber is brought into the yard from the firm's own siding. The handling and stocking of the lumber

Rear view of the McLagan factory.

An alley in the McLagan Company's lumber yard, showing tracks and lumber piled on piers.

are facilitated by transfer tracks placed at regular intervals all through the yard. The lumber is piled on cement piers, the front piers being a few inches higher than those in the rear, thus giving the lumber the proper slant for shedding rain.

There are three kilns, each having a capacity of about 60,000 feet. One of these is of steel and concrete, made by the Grand Rapids Veneer Company, and the other two were furnished by the Standard Dry Kiln Company, of Indianapolis. Adjoining the kilns is a storage shed 100 feet by 50 feet for the kiln dried stock. The heat and moisture in the kilns are regulated by synchronizing instruments. Each kiln is supplied with a Bristol self-recording temperature thermometer.

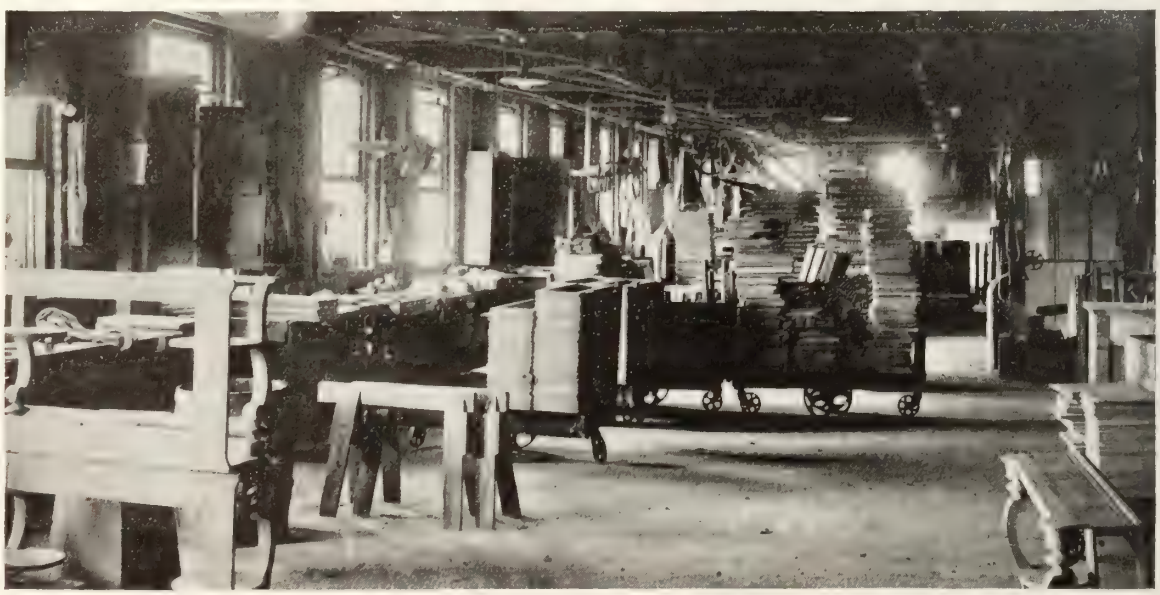
The equipment of this plant represents the last word in efficiency. In the matter of machinery, supplied by Jackson, Cochrane & Co., of Berlin, Ont., mention may be made of two self-feed band ripsaws, a 24-inch Herzog self-feed jointer, several double spindle shapers, various kinds of saws, and a large number of veneer presses. There are two 12-inch moulders or stickers, one made by Ballantyne and the other by The Hermance Machinery Company. They have here one 30-inch Baxter D. Whitney & Son double surfacer finishing planer, and one Ballantyne 36-inch single surfacer, and a double surfacer of the same make. There are two shapers by Baxter D. Whitney, of Winchendon, Mass., and two by Jackson, Cochrane & Company. A Whitney scraper gives a fine finish. Among the sanding machines is a Berlin endless bed sander.

In the veneering department there may be found a swing saw for cutting up large sheets of veneer, an 88-inch clipper, and a ten-plate veneer re-drier made by the Merritt Manufacturing Company, of Lockport, N.Y. The Dennis veneer taping machine and the equipment of glue cookers and separators, made by the A. Francis Company, Rushville, Ind., are also to be found here, as well as a 72-inch by 39-inch hydraulic press, manufactured by W. R. Perrin Co., Toronto.

In the cabinet department there are several small sanding machines and belt polishers, there being three

A pair of self-feed band saws in the Breaking-Out Department.

of the latter, namely, one Moore, one Clemens, and one Fisher. After the goods are completed in the cabinet department they pass to the finishing room and pass through the usual processes—that is, with the excep-



Cabinet department at the plant of the George McLagan Furniture Company.

tion of what is kept in the white for special finishes, this being stocked on the fourth floor conveniently to the fuming chambers.

In the rubbing room there are several pneumatic rubbers made by the Rockford Tool Company, Rockford, Ill. After being rubbed the goods go to the polishers, and then on to the trimmers on the floor below.

It may be mentioned that the reference to the machinery and equipment of this plant cannot be anything more than a cursory one, inasmuch as improved additional installations are constantly being made.

During the summer and fall of 1914 the McLagan Company installed an entirely new power plant of 450 h.p. capacity, with generators of sufficient capacity to furnish the plant with its entire supply of electric power. The engine was supplied by Goldie & McCulloch, Limited, of Galt, and the generator by the Canadian Westinghouse Company, of Hamilton.

The personnel of The George McLagan Company, Limited, is as follows: President, George McLagan; Vice-President and Manager, D. M. Wright; Secretary-Treasurer, H. S. Robertson; Superintendent, F. G. Scrimgeour.

High-Grade Period Furniture the Specialty of Classic Furniture, Limited

THOUGH rather cramped for space in their present quarters, into which they had to move following a fire at their original plant, Classic Furniture, Limited, continue to make a line of high-grade bedroom furniture in period styles. Mahogany and walnut form the bulk of the woods used in this plant, which is two storeys high, of brick construction.

In the manufacture of period designs, many of which are quite light in appearance, special attention is paid to the construction and finish of the smaller details. For instance, all the backs of dressers, etc., are of finished wood, and the insides of drawers are usually finished, thus making strong selling points in connection with this class of goods. The back of a piece of furniture is rarely noticed after it goes into the home, but almost invariably it is fully investigated from every angle before it is taken out of the store. The finish plays an important part in the appearance of articles of this class, and this is attended to on the second floor of the plant.

The machine department occupies the first floor. The equipment includes a power-feed ripsaw by Cowan and Company, of Galt, a Whitney double surfacer, a 12-in. buzz planer with round safety cylinder by Jackson, Cochrane & Company, of Berlin, Ont., a Cowan double cut-off saw, a tenoner of the same make, and a Whitney shaper. Glue joints are made on a continuous feed glue jointer, by Jackson, Cochrane & Company, who have also installed a horizontal 3-spindle boring machine, a revolving case clamp and a variety sander. A Wysong & Miles multiple mortiser has four hollow chisel mortising bits which can be operated together or independently, according to the work to be done. A Dodds dovetailer is used on the corner joints of drawers, etc. Sanding is looked after by a "Columbia" three-drum sander from the American Woodworking Machinery Company, and a Preston belt sander, supplied by the Preston Woodworking Machinery Company, Limited, of Preston, Ont. This Preston sander will sand up to 34 inches in thickness, and is claimed to be the most up to date, simple and practical machine of its kind made. Pieces of irregular shape, with flat surfaces, such as round tabletops, can all be sanded on this machine without the great variety of forms usually required, as the belt will never overrun the stock at the narrow or outside edges. It will sand mouldings up to seven inches wide, of any length.

The available space is limited, but by means of careful management in the routing of stock, each operation is allowed to interfere as little as possible with the others. The plant is driven by steam power, the engine and boiler being by E. Leonard & Sons.

The Plant and Activities of the Stratford Chair Company, Limited

ONE of the largest plants in the Dominion devoted to the manufacture of chairs is that of the Stratford Chair Company at Stratford, Ont. This business has been in operation about ten years, and during that time the size of the plant has been doubled twice. About six years ago an addition of about the same shape and size was made to the west end of the existing factory. Last year, besides another such addition to the end of the new portion of the factory, the building was extended at right angles, this bringing the total plan area of the building up to just about four times that of the original factory. The whole of the factory buildings are of concrete construction, four storeys in height. The office, which was formerly in the corner of the original factory building, has now been removed to the other end of the latest addition. The interior trim is of quartered oak—manufactured in the plant—and the office has about the best appearance of any factory office we have seen for a considerable period.

The company's chief line consists of dining chairs in oak, but of course their manufactures are not limited to this class of chairs, nor in fact to oak as a material for their manufacture. A quantity of birch is employed for mahogany finish goods. In addition to the chairs, the company manufacture a considerable quantity of case goods. The present factory provides a total floor area of 100,000 square feet.

The first floor is devoted to the cutting up of the lumber, the machining of the chairs and case goods. The draughting room also occupies a space on the first floor, besides a room devoted to the working out of new designs, With one or two machines new pieces are erected from the designs, and the details of manufacture are arranged so that the work may be done as efficiently as possible when the first order goes

through the factory. A portion of the second floor is given over to the packing of the goods ready for shipment, and the actual shipping room is separate from the packing department, so that the goods packed and awaiting loading on the cars are not in the way of the packers.

On the second floor are the machines peculiar to chair work. Here the chair stock is fully machined and sanded ready for assembly. The finished stock is sorted and distributed to the benches where the staff of bench men put the chairs together ready for the finishers. The new addition on the first floor is devoted to the sanding and assembling of the case goods.

The two upper floors of the building are devoted to the storage of goods carried in the light, to be finished as ordered, and to the finishing of chairs and case goods.

The plant is supplied with ample yard space, and a pretty considerable stock of hardwood lumber is carried. In addition to the kilns, which have a capacity not far short of 10,000 feet of lumber, shed room is provided for the storage of dimension square chair stock. From the kilns lumber comes in to the cutting-out department, where it is planed to thickness and sized on a Ballantine power feed ripsaw.

The equipment of the machine room includes two Whitney shapers, a double-end tenoner by E. B. Hayes, Oshkosh, Wis., three drum sanders with endless bed, by the Berlin Machine Works, of Beloit, Wis., and Hamilton, Ont.; boring machine by Greenlee Machine Company, Rockford, Ill.; large sticker by the Preston Woodworking Machine Company, Preston, Ont.; power feed ripsaw by Ballantine & Company (now Canada Machinery Corporation); a Falls continuous feed glue jointer, and a Porter router. Special chair machinery includes a McKnight hydraulic bending press and mortising and tenoning machines of the same make, supplied by L. G. McKnight & Son Company, of Gardner, Mass. Spindle sander and end chucking machine by J. M. Nash are other machines specially adapted to chair work. The chuck is of special interest as it churns the spindles to the neat length and chucks the ends to the exact size of the hole into which they are to fit. All glued-up stock in the plant are in clamps on a Billstrom automatic carrier.

All repairs to machinery can be effected in the plant, as a specially equipped department is provided for this purpose.

The main part of the plant is driven through line-shafting from a steam engine, but in the new wing where one or two sanding machines and a saw for cutting crating are installed at some distance from the shafting, a motor is put into drive this through.

The finishing room is provided with a large double compartment fume for fume-finished oak chairs.

The Stratford Davenport Company, Limited

AT the time of our visit to Stratford, the Stratford Davenport Company were carrying on their operations on one floor of a factory building, but we understand that they will remove shortly to a factory of their own, where they will install machinery and do all their own work. Their line of davenports and couches is one that has grown rapidly, and consequently they have to consider the extension of their business to cope with the increased demand.

The staff now employed by the company are engaged in the assembling and upholstering of the goods, the woodwork being done outside at present. In the new factory, however, we understand that it is the intention of the company to do their woodwork as well. All packing for shipment is done in the same department as the upholstering and assembling.

Special attention is paid by the firm to the construction of couches that can be converted into beds, as an alternative to the more familiar bed davenport. The couch is preferred by many people on account of the fact that it can be used for resting during the day while it is in its normal position, while the bed-davenport at best affords little more than a roomy seat. The head of the couch is made hollow to hold part of the bedding to be used when the couch is converted to the bed position.

A number of styles of finish are included in the firm's line. These styles range from plain pieces with almost severe lines, such as are preferred by many modern tastes, to quite elaborate creations upholstered with tapestry cloth.

Mr. E. W. Forsberg is the President of the company.

BLACK as a decorative color is becoming popular. The war may have something to do with it—a sentiment of respect for the fallen millions of men—but it is thought not, and its permanency is predicted. Rooms in residences and store interiors are being treated with black and white as the color scheme. They are pronounced very handsome. The Decorative Furnisher says:

"It may be interesting to remark that black is fast becoming one of the most important shades in decoration. You find it everywhere—in cheap prints, in cretonne, in chintzes, in damasks, in brocades, in tapestries, and in fact in every item of decoration where color is used.

"The furniture makers have been using it extensively. The decorators themselves find it excellent for many purposes, and we have it on excellent authority, that the new wall paper lines, when they are shown this year, will contain an abundance of patterns worked up with black designs and black grounds.

"Some of those who are always looking for the 'cause' that produces the 'result' have said that black came into use since it was the only color obtainable. In some instances this may have been, and may be still, true, but we are prone to believe that black came into vogue because of merits of its own rather than because of necessity.

"Black in decoration is unique—it is strong—it is virile, and when carefully and judiciously used there is no gainsaying that its effect is certainly wonderful. Its contrast, in some cases, is almost alarming; it's vigor is always appealing. And because of these things, we believe black is more of a new note in decoration than a 'fad.' "

Importance of the Control of Temperature and Humidity in the Furniture Factory*

HUMIDITY is aqueous vapor, an invisible gas, next in importance to nitrogen and oxygen as a component part of the atmosphere. When it is visible it is called fog, mist, haze, cloud, rain, hail, snow, frost, etc. Aqueous-vapor is perpetually falling to earth and is renewed by evaporation, quantities varying greatly with temperature and locality on surface of the earth.

Why should this interest the furniture manufacturer, who, in such years as this just past, has had enough to worry about curtailing production and hunting a market for part at least of our product, trying to finish a year that would show as little red ink as possible in the loss column of our loss and gain accounts.

It is because of the important part that this atmospheric property has to do with the manufacturing methods in the various departments of our factories as well as the extreme conditions that our finished product is subject to after it leaves us in good condition.

We are all workers of wood and experience has taught us that the good results in working and finishing this material cannot be gained by hit-and-miss methods of drying lumber, building and finishing furniture. Also that some of the same methods that are successful at one season of the year do not produce as satisfactory results at other times.

Moisture in ordinary dry air is easily absorbed by many substances such as sugar, salt, flour, wood, etc.

Wood is an organic substance. All organic substances contain pores for conveyance of their juices and are influenced by the accession of moisture, some of them very markedly so. Every specia of wood is liable to these hygrometric changes, the amount of contraction and expansion being much greater across the grain than lengthwise. To lessen expanding and shrinkage of lumber we now use lumber dry kilns, to treat our lumber, thus minimizing these troubles. It is here first that we manufacturers of furniture reckon with heat and humidity.

Experience has taught us all that we must reckon with humidity in the kiln and control it to gain maximum results. Green lumber undergoes heavy shrinkage in volume during the dry-kiln process from 12 to 15 per cent., while in weight it frequently shrinks from 40 to 50 per cent. Green lumber cooked or dried in too dry an air will honeycomb, twist, case harden, etc. To avoid these we find that three agencies, heat, ventilation and humidity, must be considered. Heat your lumber, create free circulation of air and then control the humidity so that green lumber progresses from a humid part of the dry kiln to a dryer section. This is done in all successful dry-kiln systems, some accomplishing these results one way and some another.

The perfection of instruments such as the troemroid-scalometer and the tables for calculating moisture in lumber, both of which are put out by the Morton Dry Kiln Company, make it possible to be absolutely positive when lumber is dry, and to establish and maintain a uniform dryness of lumber used in the factory throughout all seasons of the year. The weight system of establishing the dryness of lumber is one of the easiest and surest ways of eliminating a lot of trouble that has been brought forth.

It is an established fact that lumber can be too dry as well as too green, but if a factory is fairly uniformally conditioned as to humidity, this trouble will be limited, provided, of course, that lumber is allowed to cool in sticks for twenty-four hours or thereabouts after leaving the dry kiln but before being cut. It then takes on the necessary moisture from the atmosphere as it cools.

Granting that we have thoroughly and properly dry kilned our lumber, then it is that we begin working it through the mill room. During summer, part of spring and fall, this room most often is open and well ventilated, subject very much to the same heat and humidity as the outside atmosphere. In the cold months most plants are closed up and warmed as much as we can economically do after the other departments of the factory, varnish rooms, glue rooms, etc., are as much heated as necessary. The mill room being the least important to keep heated, however, it is very important to watch and regulate the humidity of this room, which can be done at little or no expense, for the dry lumber progressing through this room, if subjected to damp atmosphere, can take on moisture at the exposed surfaces.

The rise and fall of temperature is not important in this department except as it affects the percentage of humidity. The importance of the control of this department, I want to take up farther on.

The glue room, cabinet room, etc., are usually kept open and ventilated during the warm months, but during the winter are generally kept heated more even than the mill rooms, that we may better work the glue and to enable the men to skillfully handle their tools. Now, should this room be warmer than the mill room, the air is apt to be dryer, and if so, the moisture taken on by the lumber in process through the mill room will begin again to work out and thus start the shrinkage process, hence you can see at once the importance of keeping the percentage of relative humidity fairly uniform between departments, even though the temperature at certain seasons may be different.

Next comes the finishing departments, and it is here that the troubles develop or at least come to notice. It is here that we put on fillers, stains, varnishes, etc., either by brush or varnish sprays, and one of the great problems in these departments is the drying necessary between coats and the time it takes, especially during certain seasons of the year.

To minimize the time taken between the different coats of finish much thought has been given.

To hasten this work first come the hot varnish room, then the varnish dry kiln or oven, which many of you no doubt are now using. The latest and most successful development along this line is the conditioning of the entire finishing and drying departments, thus eliminating the expense of loading and unloading kilns, as well as keeping the cumbersome dry kiln out of the way, thus saving floor space. This latest method also minimizes the possibility of ruining a large quantity of furniture at times while undergoing finish.

The process of evaporation is used in making solid

*By Howard C. Cobb in the Furniture Worker

different coats of liquid finishing material. The vaporization of the liquid may be accomplished by adding more heat or by lessening atmospheric pressure, which is reducing humidity. Air may be partially dried by being cooled to a low temperature. The vapor contained will condense and be thrown down as water. When the air is afterwards warm it will be much dryer than it was in its cool state, owing to the ability of warm air to carry more moisture.

The efficiency of a drying room or any drying apparatus which uses heat or hot air as the drying medium (which is the furniture manufacturing method) will depend upon several factors, as follows:—1, dryness of the air before it is heated; 2, degree of heat that is given to the air; 3, the amount of surface of wet material from which evaporation can readily take place; 4, the volume of air current; 5, thorough distribution of fresh dry air over the dry surface; 6, the promptness with which the moistened air is removed.

If air is compelled to travel a long distance over wet surface it will evaporate moisture freely during the first part of the course, less in the middle and almost none at the end of the course, therefore it is advisable that air currents be so arranged that none of them are obliged to travel over a course of undue length.

Drying room and finishing department are usually deficient in air circulation, although well supplied with heat. Heat alone cannot dry wood or varnish; moist air must be removed as fast as it becomes saturated. Fresh air must be brought, for this contains oxygen, the great drying agent.

The greatest problems develop during the finishing process. If the varnish rooms are dryer than the mill rooms, cabinet rooms, etc., you can easily see that while the varnish is drying the pores of the wood are also giving off moisture from the wood itself, which was taken on while in the damper rooms.

Bursted lumber joints, hair lines in veneer joints, bursted columns or pedestals, fine blubbers in varnish (which are usually thought to be dirt specks, but under high-power glass prove to be chiefly air pockets, formed over the grain of the wood, caused by moisture in form of vaporous gas shrinking out of the wood). This last defect causes additional expense of hand sanding and polishing to cut these blubbers out between coats. This also wastes the varnish and causes you to finish a product that shows thin or shallow varnish, yet this job "has cost you as much for finishing materials."

The furniture manufacturer of case goods has even more trouble here than the table maker, for under such conditions the doors, and the drawers become loose and open, and unless they are finished on all sides, when subject to the damp atmosphere of a cold warehouse or of a freight car, are most apt to swell and become hard to open.

If the varnish rooms are too damp, such as they are in the warm summer months, it is a well-known fact that varnish users experience difficulty in producing desired results, especially as regarding the drying of finishing materials. Under such conditions fillers often cut into oiled stains, producing a mushy condition, etc., making it harder and a longer process to dry each coat before applying the next.

Printed varnish—flat finish and the like—are the outcome of operating in a room with too much humidity. When the doors and drawers of case work are fitted under such conditions, they will afterwards shrink, if they have unoiled surfaces. Loose-fitting doors and drawers also cause complaints from the buyers of furniture.

Now then, as a summary of our experimenting and collecting of data of over three years in the factories of some twenty-five of our customers, we have established that to work a factory most successfully it is most essential that you establish and maintain a fairly uniform relative humidity throughout, regardless of temperature; the dampest department should not be more than eight to ten per cent. damper than the dryest.

In some factories it is possible to establish a lower humidity than in others, owing to the construction and heating arrangements in these factories being different. The ideal conditions is to establish from 40 to 50 per cent. of humidity in the atmosphere throughout the entire factory, but if this is impossible for some of you, success can be obtained at from 50 to 60 per cent., but it will require a few hours longer to dry your finishing coats.

We should dry our furniture thoroughly in the white and then carefully seal up the wood and finish to keep the moisture out.

To do this most successfully we shall find a lot to be gained from reckoning with humidity and its dynamic power.

How to Select the Best Belt Drive

BELT drives cannot be standardized. There are too many conditions to be fulfilled to meet their efficiency with one rule. For this reason, every drive should be calculated separately and carefully to fill the conditions called for by the installation.

To get the best results, you must consider these various factors:

(1) How much power is to be transmitted?

(2) What is the size and speed of the driving pulley?

(3) What is the size of the driven pulley?

(4) What is the distance between shaft centers?

(5) Will the drive be vertical, on the slant, or horizontal?

(6) What is the value of space?

Answering these questions briefly, the installer of belts will be enabled to make a wise selection by following the instructions below. In any case, of course, judgment must be used in connection with formulas and mathematics. This is the way to go at it:

(1) Power is usually given as "so many horse power." A wide belt will generally transmit more power than will a narrow one, but, much depends upon the belt's speed. Thus to find the width of a belt of single thickness, multiply the horse power to be transmitted by 800 and then divide by the speed of the belt in feet per minute. The result will be the width of the belt in inches. Where the belt is to be a "double belt" use the figure 500 instead of 800, given above. Otherwise the method of computing is the same.

(2) Multiply the diameter of the driving pulley (in feet) by 3.1416. Then, multiply that by the revolutions per minute, which must be used in (1) to compute the width of the belt.

(3) Never use a pulley that is too small, either as a driving or driven pulley. Laage pulleys are best because there is less danger of slip where they are used; they are more efficient, and by use of large pulleys a narrower belt may be used. Of course, the

peripheral speed of the driving and driven pulleys is the same because they are both used under the same belt, and a belt can run at only one speed at one instant.

(4) If the distance between shaft centers is great, use large pulleys. You can then use a narrow, inexpensive belt, and the drive will be more efficient than when small pulleys and heavy belt are used. If the distance between centers is small, it may be necessary to use an idler, especially if one pulley is small and the other very large. By using an idler it is possible to bring the driving and driven pulleys very close together and thus save the cost of long belts, save space and sometimes increase efficiency.

(5) If the drive is horizontal, always run the "pulling side" on the bottom and the "slack" side on top. The same rule holds where the drive slants. Drives of this kind may be run fairly slack without trouble if the drive is designed correctly and if the belt is properly cared for. But where the belt is vertical, it makes no difference which side is the pulling side and the belt must be run tight enough so that it will surely come in contact with the lower pulley.

Sometimes, as in the case of horizontal belts, it is a good plan to use an idler in connection with vertical drives.

(6) What is the value of space Sometimes this question alone is enough to decide for you whether or not the drive will be long or short. Where space is valuable it is a good plan to bring the driving and driven pulleys as close together as possible. Personally, I prefer the short drive with pulley centers close together and with a good slack belt, made so either naturally or by the aid of a well-placed idler. Belt cost is thus lessened and the system is made ideally compace.

If you must use an idler, by all means do not run it too tight.

The above holds for all kinds of belting—leather, canvas, rubber, etc.

What is Cane?

WHAT is called cane is really rattan—a sort of climbing palm, with sharp hooks at the extremity of the plant, by which it climbs the tallest trees in the Sarawak and East Indian swamps and jungles. After reaching the top, it swoopes down till it catches another tree, and keeps this performance up for hundreds of feet of its length. Measurements taken at the root of a plant more than 500 feet long showed a diameter of a little over an inch. The forests in Borneo are looped and festooned with this curious plant, which is very tough, the natives using it for making suspension bridges in place of rope, etc.

The stem is tough but porous inside, with a hard shell or skin. This is enclosed in another hard and brittle bark that is readily stripped off. When cut into suitable lengths and sorted, the cane—to use the familiar word—is fed into a splitting apparatus, in which rollers force it against a tube-shaped knife called a "quill," which splits off the glistening, hard surface, leaving the core intact.

This core is called "reed," and forms another valuable article in furniture making. After being shaved, to make them smooth and uniform, the outer strips of cane are bleached, and bundled for the market.

LETTERS

Knotty Points

Editor, The Canadian Woodworker:

Some of your readers may be able to enlighten me in regard to a couple of questions which have been exercising my mind lately.

In the first place, there is an American construction firm advertising all its wood free from knots, under what is termed a dollar-a-knot guarantee. Is it possible for them to supply such material—especially for low-priced dwellings?

Secondly, in most of the advertisements of the better class of houses for sale in Canada a special feature is made of hardwood floors, Georgia pine finish, and so on. It is difficult for me to understand why, at such a time as this, a Southern States wood should have the preference when we have such a quantity of good hardwoods. In my opinion, our own hardwoods are superior in nearly every case, and the price should be about the same.

I should be glad to hear one or two expressions of opinion on these points.

Yours truly,
KENNETH McGILVRAY.

Dundas, Ont., 7 August, 1915.

The Toronto Exhibition

There was never a time in the thirty-seven years of its history when the Canadian National Exhibition promised more real instruction and entertainment than this year. In addition to the marvellous proofs of the manner in which the patriot at home is taking care of his resposibilities in the way of increased production that the patriot at the front may have the wherewithal to keep his place in the battle-line, there will be special features of patriotic and historic significance.

The war spectacle in front of the Grand Stand will be quite the most elaborate pageant ever presented by the Fair, while the Model Military Camp, aeroplane flights and the mining and torpedoing of ships in the harbor, supplemented by the war trophies, will be a revelation.

The new Giant Midway never presented a more diversified list of attractions, while the Hippodrome and Circus in front of the Grand Stand will be a triumph in the amusement line.

The Directors are looking forward to a repetition of the "Million Year" and are planning their programme on a corresponding scale.

Despite the claim so often made that it costs more to handle scrap wood than it is worth for reworking, the fact remains that almost every day we hear of the utilizing of waste from the manufacture of large articles, for making smaller ones. Some day we will get this worked out until there will be no such thing as a waste product in woodworking; even the sawdust and shavings will be utilized to a good purpose. Then woodworking will be as efficient as the meat packing houses.

We depend so much upon the dowel pin in joinery that this little item really deserves more thoughtful attention than it usually gets.

Sheraton Art and Its Characteristic of Intricate Elegance

By James Thomson

WHAT is the Sheraton style? For one thing, it differs very materially from that of Chippendale—the subject of an article in the February issue of The Canadian Woodworker. There is indeed small reason for confusing the two—yet that is precisely what is done constantly

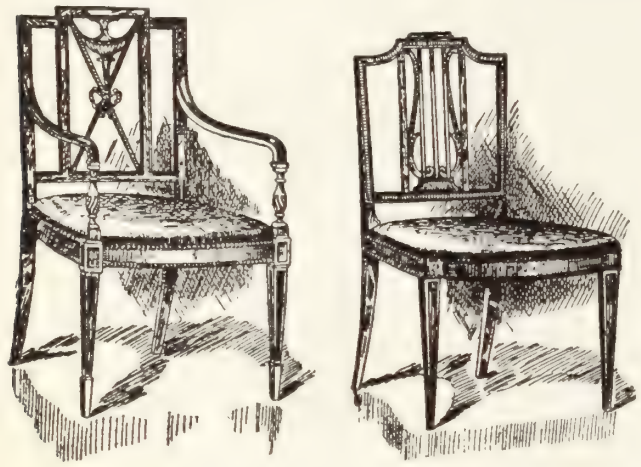


Fig 1.—Characteristic Sheraton chairs.

by nine-tenths of the people who are interested in such things at all. This is true even in England, where one might expect something different. It is common enough to hear people speak of a Chippendale chair when they have in mind all the time a slender chair such as Sheraton exploited in his book of 1791. Of simple elegance, delicately thought out, reed-legged chairs of oldtime aspect have for long been dubbed "Chippendale" even by the trade. To dissipate in some small degree this misunderstanding is the purpose of this paper.

Neatness, refinement and grace characterize the Sheraton product. Always the units are precise and of a diminutive negative order. Chippendale is virile, breezy, flamboyant; Sheraton, formal, quiet, sedate; Chippendale is masculine, Sheraton feminine. Both styles, however, have grown out of the thought and need of the periods which produced them. Chippendale had his style formed by the freedom of the Queen Ann domination. The Sheraton product, on the other hand, is expressive of a time when people were refining their tastes, and "hunting parsons" and "Squire Westerns" were becoming less common. Men still drank deeply, but in courtly manner. Robert Adam had left visible evidence of his genius in many a town and country house. The middle of the century had seen him build the beautiful and refined Adelphi Terrace and adjacent streets in the heart of London. Furniture to accord with the classic buildings of the

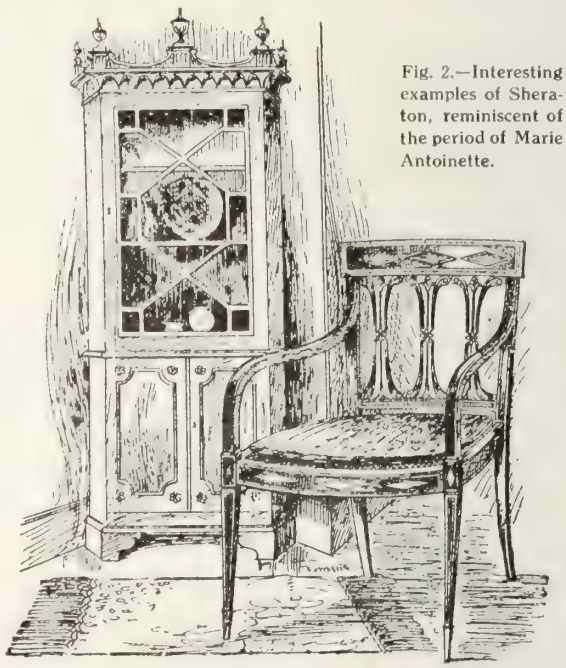


Fig. 2.—Interesting examples of Sheraton, reminiscent of the period of Marie Antoinette.

Adam school of architectural thought was in demand, and Sheraton—drawing master, lay preacher, and designing expert of the neat, man-milliner style—was well fitted to cope with the prevailing condition. His efforts, however, did not bring him fortune. He was one of the world's "impracticals," and sometimes had difficulty in earning even unbuttered bread.

Sheraton in constructional principle always affected the straight line. His chairs in some cases closely resemble the style of Marie Antoinette, though such is not the type by which he is known. In Figs. 1 and 2 are shown chairs that are characteristic. That in Fig. 2 is less common than the others. It is indeed a graceful specimen of his skill, and strong withal; beautiful of line, light as regards construction, there is at the same time no sacrifice of stability, nor does it appear fragile.

In contemplating Sheraton ornament we are constantly reminded of the Adam brothers and the French designers of the school of Louis XVI. Sheraton bor-

*This article is one of a series appearing in The Canadian Woodworker and Furniture Manufacturer. The first, published in our February issue, was devoted to the Chippendale style; the second, in our June issue, to the Hepplewhite style; the third, in our July issue, to the Adam style. The series will be brought to a close, not by the present article on the Sheraton style, as announced in our last issue, but by an article on the Jacobean style, which has been prepared expressly for this journal by Mr. Thomson, and which will be published in the September issue.

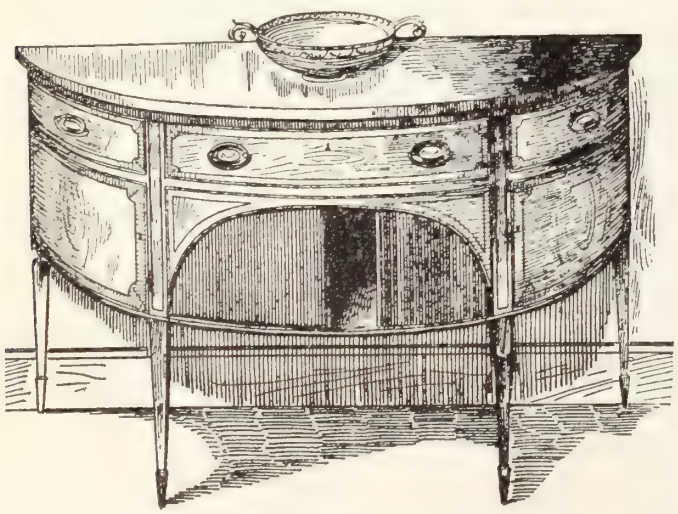


Fig. 3.—A sideboard designed by T. Shearer, whose creations were an important influence in Sheraton's work.

rowed extensively the ornamental feature that accorded with his style, but always placed upon it the impress of his own individuality, thus making it appear to the casual observer as his own original design. His work was formal, conventional, not such as to attract the ordinary eye. He showed less originality than Heppelwhite, whose motif, as we find it, was his own. Many Sheraton sideboards are based upon the creations of T. Shearer, who published a book of designs. In this book are many novel features, among the number being the employment of drawers and closets in sideboards. The claim is made that up to this time sideboards such as we find them in the work of Heppelwhite and Sheraton were unknown. In the publications of Chippendale and Adam the nearest thing to the sideboard is the sideboard table, which

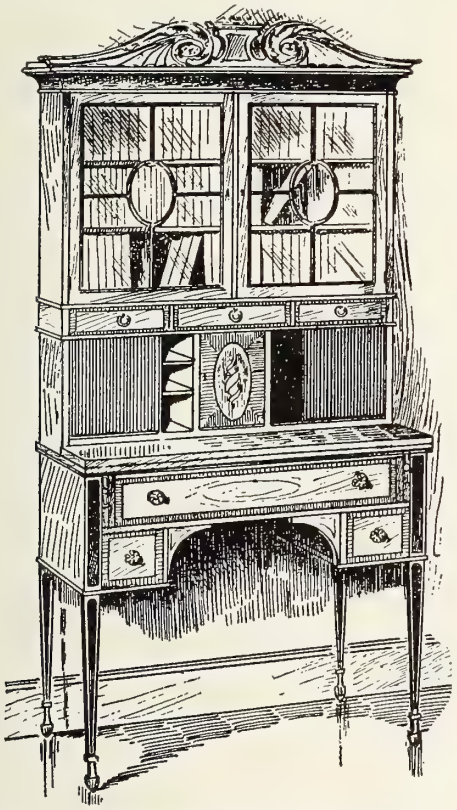


Fig. 7.—A Sheraton bookcase-desk of ingenious design.

was really a "side table," and drawerless as well as cupboardless. They were, however, very handsome pieces of furniture. In Fig. 3 is shown the character of sideboard attributed to the genius of Shearer. He was very fond of the semi-circular front, but in this he was not original, Robert Adam having anticipated him by applying it to the cabinet. In Fig. 4 we have a sideboard in what may be termed Sheraton's premier manner. Many such sideboards have serpentine fronts, while closets are wider than they are high. In Fig. 5 is a typical Sheraton sideboard adapted to Colonial temperament. As a rule carving is used sparingly, nor is there much inlay, aside from fan corners and fine lines of ebony or holly. Beautifully marked mahogany veneers, accurately matched and quartered, are relied upon for surface effects. Cross-banding with lighter or darker wood serves most admirably as a boundary beyond which in drawer front and closet is a neat beading that protects and encloses.

Some people are possessed of the idea that all sideboards of square-leg type should be ascribed to Heppelwhite. This is a mistake. Sheraton employed

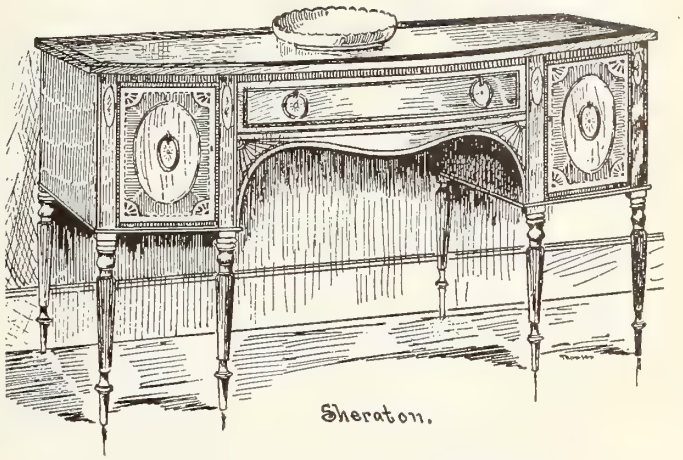


Fig. 4.—A sideboard in what may be termed Sheraton's premier manner.

both the turned leg and the square. Heppelwhite the square form alone. In Fig. 5 we have a typical Sheraton sideboard of the turned and beaded-leg pattern. Some such sideboards have rounded ends—never at any time a Heppelwhite practice. Nor did Sheraton ever employ the concave end, that being a distinction reserved for Heppelwhite alone.

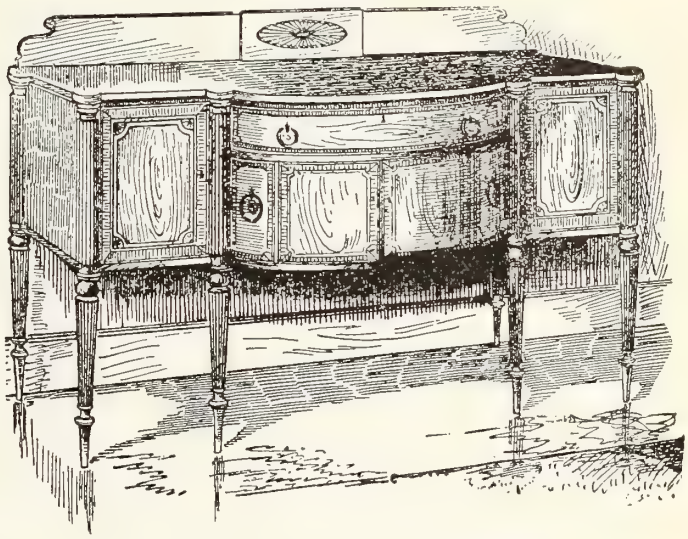


Fig. 5.—Colonial adaptation of Sheraton sideboard.

In Colonial sideboards the drawer and closet arrangement is apt to differ from the English originals. The deep drawers shown in the Fig. 5 model were intended for wine bottles, of which in days of old there was plentitude. In some instances the centre closet

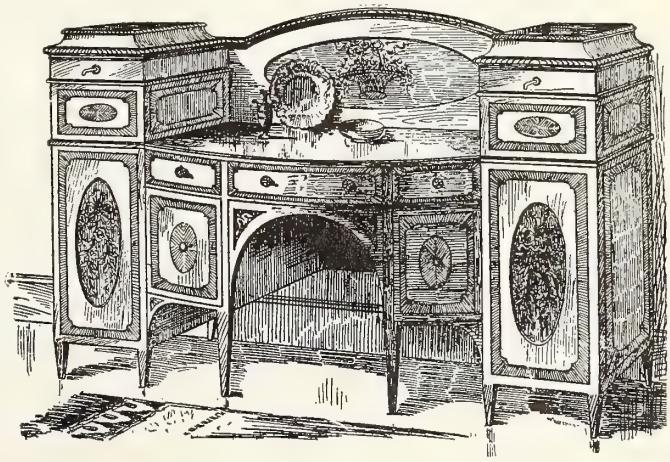
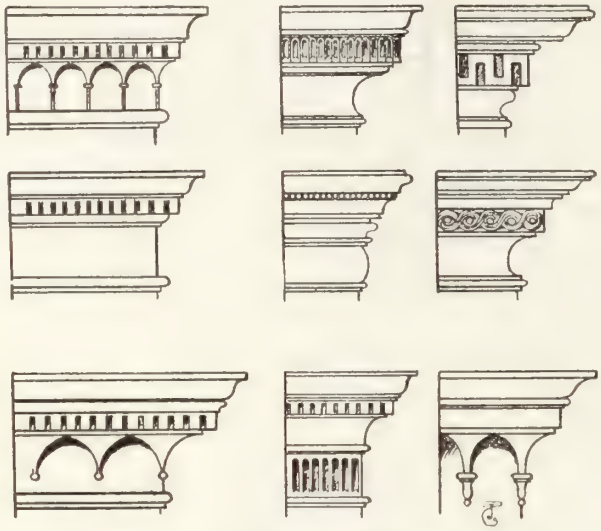


Fig. 6.—One of the most elaborate of the Sheraton sideboard designs.



Typical Heppelwhite cornices. Typical Sheraton cornices.
Fig. 8.

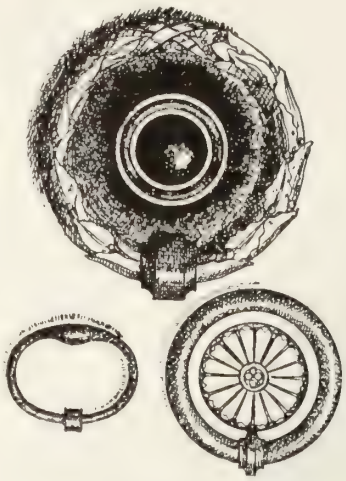


Fig. 9.—Typical Sheraton handles.

was arranged to hold wine-glasses. In a suitable rack suspended by the bottoms, the rows of glasses appeared like crystal bells. In Fig. 6 we have a notable example of the master at his best. Of good proportion, admirably spaced, here is a sideboard that requires a roomy place for its setting. The pedestals were lined with tin and used for plate warmers or to contain, in a top reservoir, hot water. Upon each pedestal no doubt a suitable vase was intended to be placed, one at least fitted to hold knives.

Sheraton corner cupboards of the kind shown in Fig. 2 are quite common. The designer was fond of lozenge-shaped panels. So far as I know, Heppelwhite never employed this device—a circumstance that might be of some importance in the matter of identification.

Sheraton was especially happy in the matter of desks and ladies' writing tables, with interiors ingeniously and wonderfully devised and partitioned. In Fig. 7 we have a handsome little example of this. Many are to be met with the bookcase portion omitted.

While to the ordinary observer there may be similarity between the Heppelwhite and Sheraton cornice, there is in fact a wide difference, as a glance at Fig. 8 should make plain. The Sheraton cornice moulding, while pleasing and well arranged in the matter of light and shade, is of the "rule of thumb" order, which may or may not be classically correct.

Between the Heppelwhite and Sheraton handles there is a difference. The Sheraton handle (employed both on drawers and closets) is round, while that of Heppelwhite is elliptic. In Fig. 9 we have the typically correct Sheraton handle. There are many different designs, but all have the ring in some form. For small drawers rings and knobs are commonly to be found.

Sheraton was a designer who seldom sacrificed stability for an idea—a practice Heppelwhite was sometimes prone to. Light and graceful as is the Sheraton chair, it is never weak, nor does it appear inse-

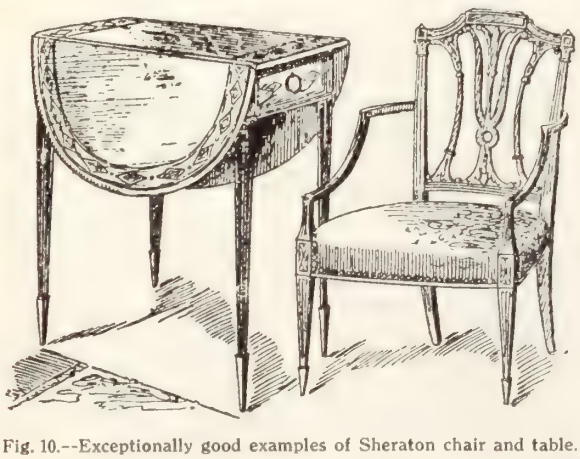


Fig. 10.--Exceptionally good examples of Sheraton chair and table.

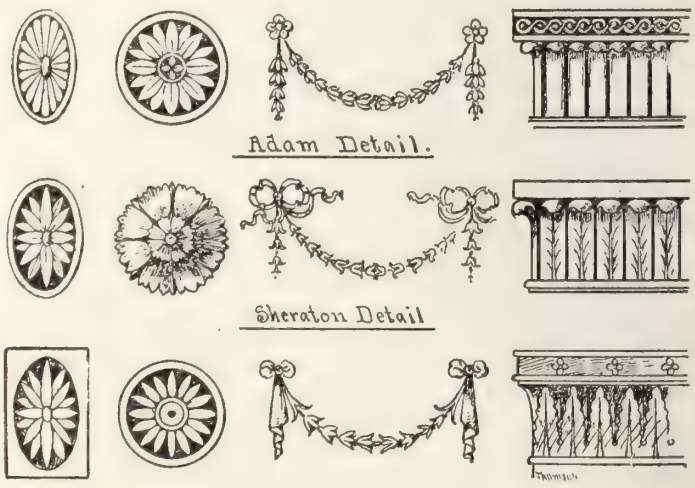


Fig. 12.—Heppelwhite detail.

cure. Spanish mahogany, rosewood and satinwood are of tough fibre and well suited for light construction. Note the manner by which stability is conserved by thickening at the point of junction of seat and back legs.

In Fig. 10 we find the designer opening an unusual though admirable vein. Here the manner of merging the arm into the front leg is interestingly done. In the sofa delineated in Fig. 11 we have an excellent and characteristic example.

Comparison may be made in Fig. 12 of the manner of treatment of identical motives by three notable designers. Heppelwhite and Sheraton borrowed from Adam, who in turn was indebted for his ideas to the ancient Greeks and Romans.

In his ultimate period at the end of the eighteenth century and the opening of the next Sheraton exhibited a deterioration of his powers which was truly pitiable. Fortunately for his reputation, few of his latest designs ever had vogue—hence it is for posterity to remember him at his best.

In some American examples the carving is too heavy, while the turning is more suggestive of the Empire style than it should be—which is not to be wondered at when we consider that probably the work was done as late as 1810, coincident with the advent of the other. Carving in the English Sheraton product was always refined, while the members of the turned portions were small, and had more of Greek than Roman feeling.

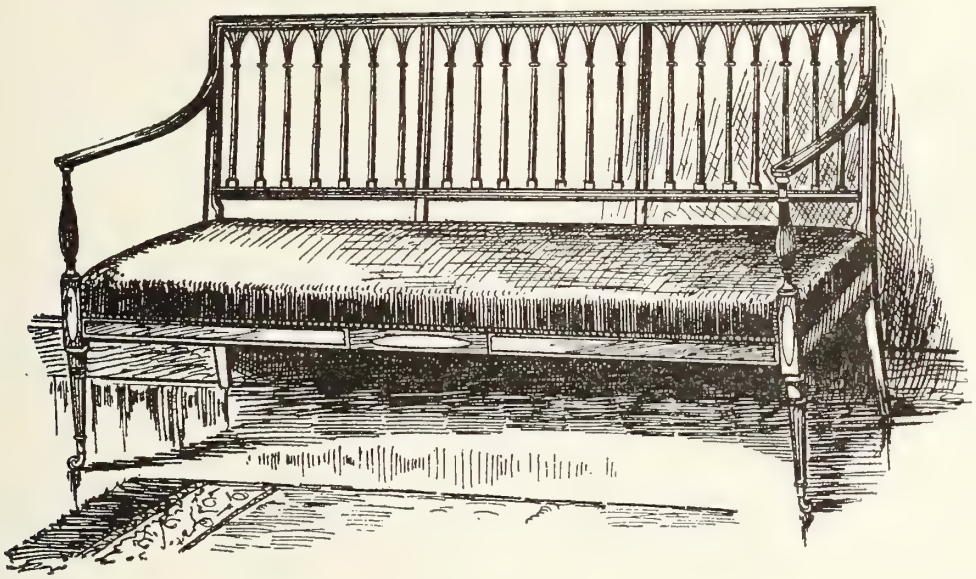


Fig. 11.—A Sheraton settle of simple and exquisite design.

Belt Dressing

NO one kind of belt dressing is good for all kinds of belts, and this is, no doubt, the cause for unjust and unwarranted complaint coming from some users of belt dressings—they use a leather belt dressing for a rubber belt, or vice versa, and thus make matters worse than had they used none at all. Another practice which leads up to the condemnation of a dressing that might otherwise prove itself valuable if given a chance is in the application of a dressing when the belt is all covered with dust. Nine times out of ten, in doing this, the dressing penetrates the dust, and after loosening it up, the whole mass is thrown off in flakes and the mission of the dressing is thus lost entirely. If the operator, however, would watch this and apply the dressing a second time he might get it to stick and perform some service after the second application. This is bad practice, however, and is not to be recommended unless the chances of doing it in a better way are out of the question.

Before applying dressing to a rubber belt, if you have the kind to apply to that kind of a belt, brush the belt off thoroughly with a brush that will find the bottom of the dust, then, with a brush or suitable cloth, apply the dressing to the full width of the belt —not right in the center, as some do it. The common practice of applying dressing only when the belt is found slipping, is another impractical thing. It proves to any man of fair judgment that the one doing it is either too busy to do this job at a time when it should be done, or neglects doing it when opportunity offers. Remember that the dressing should not be put on so heavy that it causes the belt to incline to follow the pulley and only releases when forced to by natural cause, and then makes a terrible cracking noise when it does let loose. In seeing a belt follow the pulley and hearing the cracking noise in its tearing loose, one must understand that there is not only an unnecessary strain on the belt, but that it is bound to take considerably more power. A belt should be wide enough, and heavy enough to pull its load, under ordinary circumstances, without resorting to such extremes as mentioned. The dressing suitable for a leather belt is pretty apt to rot a rubber belt. This is caused by the animal fat used in its composition. Where a leather belt becomes so full of oil that it inclines to slip on the pulleys, it is a good plan to wash the surface with ammonia, and it is also good practice to use ammonia in washing the surface of the belt preparatory to applying the belt dressing. Save trouble and power by keeping your belts in good order.

The saw gummer gets its name from the fact that it is used to dress down that part of the saw around the base of the teeth that some facetious man might designate as gums. It's an odd derivation, but there are many other things in this world that can give it odds and beat it.

QUESTION BOX

A Practical Department of Reference for the Practical Man

Increased Capacity of Exhaust System

Q.—"In order to increase the capacity of our exhaust system with the least possible outlay in money, we desire to connect another fan into our present separator, which is liberal in size, and, in fact, too large for the present purpose. We are somewhat puzzled, however, to know what will be the action of the outfit, provided the smaller and later addition should not be running for any reason. It would seem that this would produce a back pressure and blowing back of the sawdust and shavings in the idle pipe, and, if so, would minimize, in annoyance and trouble, the advantage which might have been gained in utilizing the present separator. We shall be glad to receive suggestions as to how this difficulty may be overcome."

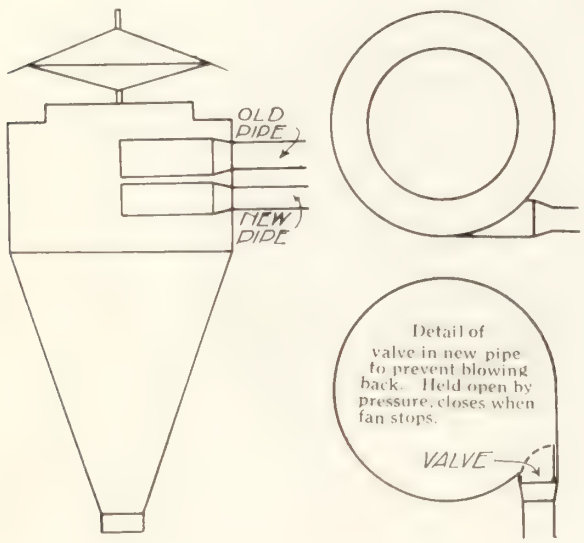


Fig. 1.

A.—The contingency you name would certainly develop and cause no end of trouble if the pipes are simply connected into the separator and no provision were made for the escape of the air, which must get out some way. The writer once inherited an outfit of this kind, and the following remedies were applied, resulting in considerably better draft and almost complete absence of blowing back of dust when the smaller fan was not in operation. In the first place, you say that your separator is over size, but if the large opening in the top is not three times the diameter of the pipe leading to the separator from the fan, it is not large enough to allow the free escape of the fast moving air, and should be enlarged. Find the area of each discharge pipe which you are to put into the separator, and add them together; then multiply by 3.25 to allow for the additional friction, caused by the mingling of the two currents of air at different velocities, and find out what the diameter is of the circle, the area of which you have just figured. Measure the opening in the top of the separator, and, if it is smaller than the figures indicate it should be, enlarge it, provided you will not have to increase the size more than fifty per cent. If it needs to be increased more than this amount, you will have to get a new separator for your small fan and keep them separate. Assuming, however, that your separator is now in the right proportions, cut an opening just under the present entrance to the separator of the proper size to take care of the new entrance pipe, making sure that the entrance is on a tangent with the circle of the separator, so as not to interfere with the swirling mass of air within while the outfit is in action. If the new entrance is properly designed and the top of the separator is large enough to relieve the pressure inside, there will be no back pressure in the new pipe, or at least not enough to cause any trouble. If, however, back pressure develops, an automatic damper, operated by the pressure of the larger machine, may be installed over the smaller pipe, so as to be held open while the fan is in operation, but closed as soon as it stops, The attached sketches clearly show the constructional details, and the outfit will be found entirely satisfactory, especially if you take the pains to speed the two fans so as to produce the same pressure at their entrances to the separator.

* * *

Installing a Band Saw

Q.—"We are going to install a band resaw, and the most favorable location we can find for it in our plant, in order to handle the work economically, is about forty feet from the nearest line shaft heavy enough to drive the machine. Would it be possible to belt the resaw direct from this shaft, without putting in a countershaft? What arrangement of idlers would be necessary, and how could provision be made for stopping and starting the machine?"

A.—You do not say whether your machine will be installed on the same floor as the shaft or whether it will be on the floor above the shaft, which makes considerable difference in the rig employed. The chances are that it will take an eight-inch double belt at least to drive the machine, and a twelve-inch would be better if the machine is to run a saw over five inches wide. In case the drive shaft is on the same floor with the saw, you have just about room for a good strong drive, obtaining your control of the machine by shifting the final belt, which is quite feasible if the shifter has large easy running roller pins, and the belt is either laced with a Jackson lacer or glued. Such an arrangement is shown in Fig. 2. Do not attempt to obtain a single drive if the conditions are as indicated in Fig. 2, and any arrangement of idlers would be cumbersome and unsatisfactory besides being hard to control, as the driving pulley, necessarily being above, would keep the final drive running while the saw was idle. The necessary arrangement of idlers would take up too much room and require too much expensive belt. Clutches are also unsatisfactory for starting a bandsaw, on account of the excessive size required to take care of the heavy starting load. If your saw is located

on the floor over the line shaft, you have an excellent chance to use an idler or tightener which, installed in this manner, makes the ideal drive for a bandsaw, allowing, as it does, the final drive to be a short belt, easy and cheap to replace in case of accident, a sure

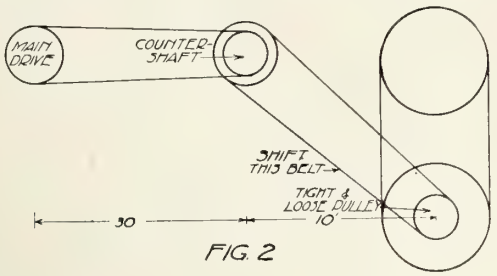


FIG. 2

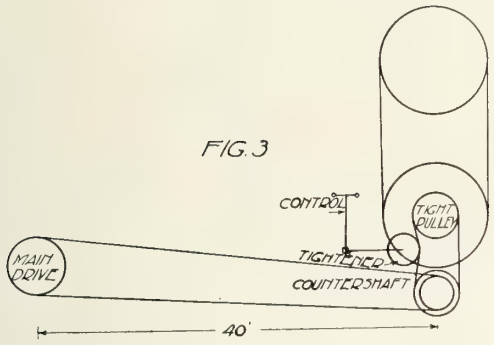


FIG. 3

and extremely flexible starting rig, and one which is instantly adjustable to a heavier load. When the saw is idle, the belt hangs loosely round the driving pulley, and the whole arrangement on the operating floor is small, compact and takes up the least possible space. Fig. 3 shows a line drawing of this arrangement. The writer has used all kinds of drives, and you may rest assured that the two described are all right, with the preference to the one shown in Fig. 3.

* * *

A Problem in Shell Boxes

Q.—"We, in common with many other manufacturers of furniture, have taken orders for shell boxes, in order to keep our plant in operation, and among the many problems which have arisen in regard to this

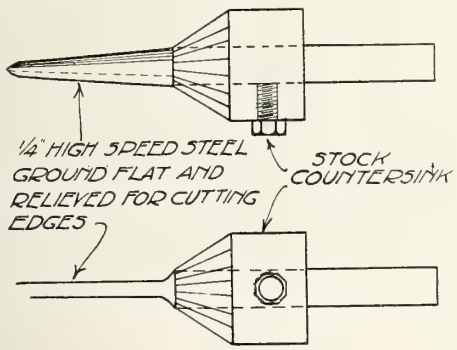


Fig. 4.

perfectly plain and apparently simple proposition is that of providing countersink drills for the inch and a half number fourteen screws which hold the handle onto the end. We can get a nice hole all right if we go slowly enough with the regulation bits, but when it comes to the fast work, made necessary by the extremely low price, nothing we can get hold of will stand up. We are very much interested to know if others have found this same difficulty, and what means they have taken of overcoming it."

A.—The best thing in this line is provided by a separate bit and countersink combined in one tool, as shown in Fig. 4. This allows the countersink, which will probably never break, to be of the best form for the work, while the bit, which will certainly break from time to time, may be cheaply and quickly replaced. The bit, in this case, is made of ¼-in. high speed steel, tapered and ground flat and also ground for a cutting edge on both sides, while the part holding the countersink remains the full size and extends up to form a driving hold for the chuck. The countersinks can be bought from bit manufacturers, being a standard article, but the twist drills usually furnished with them are unsatisfactory in this case, as the hole must be bored to fit the screw, allowing all the threads to take hold without exerting a splitting strain on the kiln dried end. Ordinary steel does not hold its edge for this work, but high speed steel will hold its edge until it gets red hot.

* * *

Glue Foaming

Q.—"Why does a glue spreader sometimes cause foaming when the same glue can be spread by means of a brush without any of this trouble? We find that our spreader sometimes behaves in this way and we are at a loss to account for it or to find a means of remedying the difficulty. Perhaps some reader of the Canadian Woodworker may be able to assist us to correct this fault."

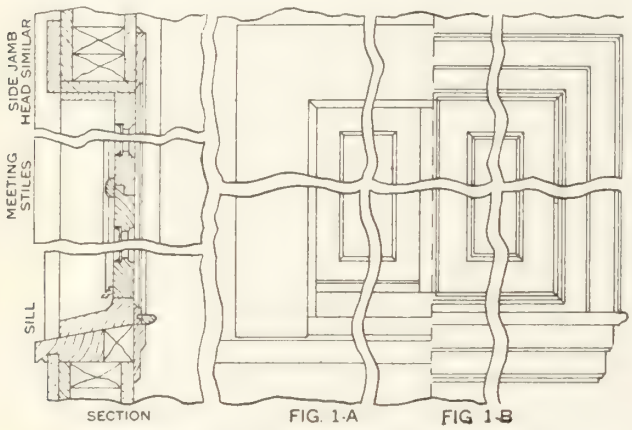
A.—The foaming, referred to, is due to the nature of the glue. Some glues will foam and some will not, regardless of the price or quality. Of course, foaming will not do in a spreader, and, if this occurs, you had best take the matter up with your source of supply. They can, if necessary, add chemicals in the course of manufacture which will prevent foaming, and generally do this if they know that the glue is to be used in a spreader. In case of emergency, the addition of a little milk or tallow will stop the foaming for a short time, but these remedies are not ones to depend upon. You can get glue which will not foam if you specify it in purchasing.

Box and Case Trade in England

THE box trade continues brisk, a great amount of work still being done for government requirements, as well as a fair amount for those trades which are large consumers of boxes, says the London Timber Trades Journal. Suitable timber is very hard to get, and is consequently very high in price, in some cases, notably spruce, double that of pre-war times. Unfortunately there is still great competition in the trade, which makes it very difficult to get an adequate return for the enormous advances in wood and other material, wages, etc. Good reliable men seem to be scarce; there is plenty of work, good wages, but thrift is not amongst the virtues of the operators. Manufacturers, we are told, have already got the tools; what they require are reliable men who can earn a good week's wage and look after it when they have got it. They would, we believe, welcome a government official specially detailed, to see to the output, to obviate as much as possible the great delays that are occasioned at the depots, and other defficulties with which the manufacturer is suffering during these anxious times.

Detailing of Frames for Modern Residences

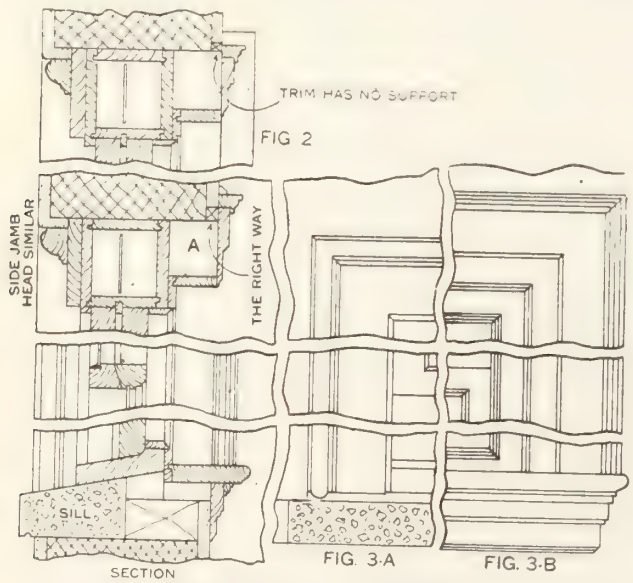
MANY of the more pretentious residences of the present time are built of hollow-tile and stuccoed on the outside. Owing to this hollow-tile wall, the window frames must necessarily be constructed in a somewhat different manner than are the frames for a brick wall, says John Wavrek, Jr., in The Woodworker. Having come in



Dormer window with casement sash swinging inward.

contact with various makes of these frames, it seems to me that a description of some of them would be of interest.

There is a tendency at present to have most of the second and third floor inside finish in white. Where this is the case it is desirable to use basswood or poplar trim, which is very suitable for a white finish. The pulley stiles, however, should be made of some harder wood; yellow pine is used very extensively for this purpose. In order to show the inside finish alike it is necessary to construct the frame so that this result is obtained. In the sketches herewith several different



Window frame for hollow-tile wall.

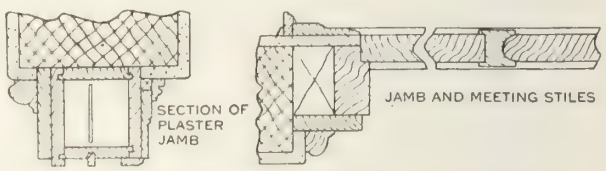
kinds of trim are shown as applied to modern buildings.

Fig. 1 shows the method of building a dormer window having casement sash which swing inward. The discussion of this particular frame in various journals, from time to time, has no doubt resulted in producing a good casement frame. When the sash is hung on hinges at the sides, so as to swing outward, it is an easy matter to construct a water-tight frame, comparatively speaking. But there is an objection to such a frame, for it is unhandy in case it is desired to put a fly screen on the outside. The dormer frame shown is designed to fulfil this requirement. The sash swing inward, and the method of construction is such that the frame gives good satisfaction. Fig. 1-A shows part outside, and Fig. 1-B part inside elevation.

Although the casement frame is used quite often (and it has some features which appeal to most people), the double-hung frame possesses several advantages over it, and for my part I very much prefer the latter. But since the casement frame is still with us, and no doubt will be for some time, it is well to make it in the best possible way.

In Fig. 3 is shown a double-hung window frame of special make, designed for a hollow-tile wall with stucco finish outside. Fig. 3-A shows part outside, and Fig. 3-B part inside elevation. Owing to the large size of the sash the frame requires a large weight-box. In this case the reveal on the inside is 6¾ in. from wall line to jamb.

Fig. 2 shows a faulty inside trim as it was actually done on a job which we furnished a short time ago. The inside casing was plowed as shown, and naturally



Window frame for bathrooms, etc., and section of French window.

the trim had no support to which it could be nailed. Of course, blocking could have been provided whereon to nail it, but the contractor objected to this extra work. The result was that we plowed the casing farther back, and thus overcame the difficulty, as shown at A, Fig. 3.

Another style of inside finish is shown in Fig. 4. In this case the jamb is plastered to the weight box of the frame; the small wall mould takes care of any inequality in the plastering. This style of window frame is suitable for bathrooms, toilets and bedrooms.

The French window frame is also extensively used in the better class of houses. The make-up of the frame is of the same design, practically, as the door frames. The sash, which are usually in pairs, have the meeting stiles made in various ways, either rabbeted or with an astragal joint, as shown in Fig. 5. I hope that this article will be instrumental in bringing up a discussion on the important subject of frames for modern residences.

During the year 1914 Germany imported timber to the value of $95,778,578, of which Canada's share was $18,326. Germany's exports of timber were valued at $7,361,340, of which timber to the value of $19,516 was sent to Canada.

It takes so much power to drive a shavings exhaust fan that no woodworking plant should be satisfied to operate any but the best, for the saving in power here may easily pay for the equipment.

The Hardwood Market

IT is gratifying to be able to report that the hardwood market has shown some improvement during the last month. This improvement is attributable in no small measure to the steady expansion of the export movement, although the domestic demand shows a gradual strengthening. Orders have been received in large volume, with more regard for future requirements. Prices, while not materially advanced, are steadier, which in itself is a favorable indication of the laying in of supplies by factories. While the general demand in the east has gained steadily, the prospect of some building demand in the agricultural sections of Western Canada as the result of favorable harvests has been encouraging.

There has been considerable discussion of the portable house scheme proposed by the Allies. Rumors of such a solution of a colossal problem have tended to buoy the market and increase optimism as to the outlook for future business.

A more confident note is sounded in the last trade review made by the Southern Lumberman, from which we abstract the following:

"A steady and fairly satisfactory summer business is being done in hardwoods. Buying continues to be in small lots, but is of very good volume in the aggregate. Both retail yards and consuming factories are buying conservatively, and though larger and more frequent purchases from these sources are expected in the fall as their current demands make necessary, immediate buying in large quantities by either the consumers or the retail trade now seems unlikely. That the stocks on the yards of the factories and of the retailers are low and are broken, is well known, and that they must be replenished during the fall seems certain. It is not likely that this replenishment will be undertaken in large lots, but that it will be accomplished by purchases increasing steadily in volume and in frequency. In fact, it is hardly to be expected that present buying policies will be greatly changed during the war, but if the present economic conditions which are admittedly bringing about a return to prosperity continue, a good fall trade in hardwoods must be developed through the steadily increasing necessities of builders and of the consuming trade. As war orders are being filled unemployment in this country is rapidly dwindling. Good crops are being harvested and are in prospect, despite damage from wet weather. There is a very fair export business in hardwoods, present difficulties in shipping and in marketing being considered. There is greater activity in shipbuilding than this country has probably ever seen before, and large orders from railroads and car building companies are being steadily received.

"Furniture factories and manufacturers of horse-drawn vehicles are coming into the market again, but are buying conservatively. Demand from automobile factories, however, is good. The feature of the market for the past week has been the call for low-grade hardwoods for crating for war munitions and from the box factories which are catering to the same business. Packing requirements on this class of shipments are said to be rigid, particularly that for the shipment of shells and ammunition. Large orders for coffin boards for shipment to Europe are also reported. These orders call for wide red oak and tupelo. A big shipment of tupelo for this purpose is reported to be already on the way. Flooring factories are now absorbing much oak, beech and maple, and are expecting a good demand in the fall. The demand for walnut for high grade furniture and for the manufacture of gun stocks continues without abatement. More walnut timber, however, seems now available and the volume of movement in this wood continues to increase.

"The relative demand for the various woods shows little change from week to week. Oak continues to move in largest volume, with ash, poplar, gum, cottonwood and walnut sales on a good basis. Chestnut, sycamore, basswood, hickory and other woods are being sold practically in the same volume as during previous weeks, though the call for tupelo has improved somewhat, as noted above. Prices show little variation save on walnut. The cypress market is practically without feature, though some stocking up is being done by retail yards in anticipation of fall demand.

* * *

The Market for Hardwood in Great Britain

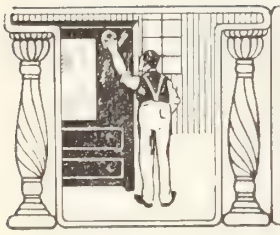
Commenting on market conditions in the United Kingdom, The Timber Trades Journal, of London, Eng., says:—

"The consumptive demand for hardwoods of all kinds, and particularly those suitable for motor-body building, continues active. So far as the cabinet-making industry is concerned there is some slackening off to record, due mainly owing to the lack of skilled labor to manufacture furniture. Taking the position of the market as a whole there is nothing much to complain about, and the prospect is far from discouraging. Prices remain very firm, as, indeed, they must do until such times as lower freights become an actuality. There is certainly no room for shippers to cut their free-on-cars-at-the-mills prices, because even now these are at a low limit. The bulk of the high prices on c.i.f. purchases are secured by the steamship companies.

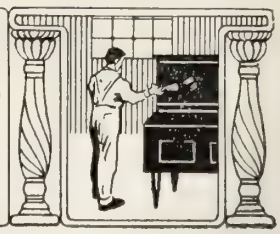
"A little pause is noticeable in buying on c.i.f. and ex-quay terms. To what extent this is due to the inability of shippers to quote, or the disinclination of buyers to complete contracts, is a matter of conjecture. This much, however, can safely be said, that the fresh stock lists with prices attached, recently to hand from shippers, show, if anything, advanced quotations.

Arrivals so far as lumber is concerned are moderate, despite the fact that one or two steamers have just reached this port with fair quantities on board. Low quality black walnut lumber is in better supply, and these fresh arrivals will appeal with interest to cabinet-makers. Meantime, there is nothing special to report regarding prime planks except that stocks are very meagre indeed and prices high. There is some disposition on the part of shippers to try and push up the prices still further of wagon oak planks; whether they will realize their objective or not we cannot say. Prices are now on a very high level indeed. As illustrating the cost of fresh supplies of Japanese oak, it is reported that present freight rates are 4s. per cubic foot calliper measure. Clean, sizable, white ash logs command much attention in this market at satisfactory prices. Prime ash planks are scarce and dear. Prime Quebec birch planks and lumber are in excellent demand. Prices have had to be advanced owing to higher ocean freights."

When a machinery salesman leads a customer into expecting more of a machine than it will do, he often creates unnecessary dissatisfaction. With machines, as with men, we are best pleased with those which do more than we have been led to expect of them.



THE FINISHING ROOM



Rubbing and Polishing

Specially contributed by W. J. Beattie

THE last but not the least operation in the finishing of furniture rubbing and polishing, is the most physically strenuous in this line of work. This is especially true when all the rubbing is done by hand and the surfaces are large, as on table tops and case goods. To rub extension, or other large table tops, day in and day out, is the hardest kind of work, because there is little change in a man's working posture, and, if any man should welcome help in the way of rubbing machines, surely the man engaged in such laborious work should do so. But does he? Not always.

An instance that came under my own notice happened a few years ago, when pneumatic rubbing machines were being installed by the more progressive furniture manufacturers. There were from five to seven rubbers employed in that department, according to the orders needed The piece-work system had been in vogue for some years, and the men were making fair wages. A rubbing machine was installed, having two units. This, as is usual in such cases, gave rise to gloomy prophesies from the men, or at least from some of them—the prices would be cut and fewer men would be needed to do the work, which was, of course, exactly what was expected; if not, why install the machine? After the machine was set at work, two of the men, with considerable reluctance on their part, were instructed in its operation and care. The piece-work prices were not interfered with until the men had become fairly expert in handling the pneumatics. When that time arrived the proper adjustment of prices was arranged, and though there was some discontent for a few days, the work proceeded satisfactorily, and it was noticeable in a short time that the machines were used on parts of the work which before had been pronounced impractical by the men.

The method of work in the rubbing room was somewhat changed, the machines doing all the portions that were impossible, and the article pushed along to men who did the necessary hand rubbing. In this manner, the machine rubbers were kept going as steadily as possible and the lump sum of earnings was divided pro rata among the men engaged. In a short time everything was running as smoothly as ever, and those who had at first grumbled the most became the most enthusiastic advocates of the pneumatic rubbers, and wished they had been invented years before. This is the usual result of improvements. The employees were pleased and benefited, and the employer got his return for the investment in a greater production and lower cost.

None of the men lost his lob, as the surplus were employed in other parts of the finishing room, and at that time men could not be had.

On large surface work, one rubbing machine will do the work of three hand rubbers, and the man running it will not expend anything like the vital force he would in the same length of time, hand rubbing.

Where both oil and water rubbing are done, and there are two or more machines, it is necessary to confine the units to either one or the other, as it is easily understood that if that were not done, the felt in the holders would have to be changed, the rules for a machine being the same as for hand rubbing. A good plan to ensure cleanliness in a rubbing room is as follows:—If the product is largely case goods, have the floor in the rubbing room made into shallow dish-like depressions at the places the actual rubbing is done. These are covered with heavy galvanized iron, or other suitable material. In the centre of the depression there should be a hole, say 1½ to 2 inches in diameter, running through the floor and piped to discharge into a cess pool or sewer, the depression being pitched towards this pipe. When the article is washed off to remove the pumice stone, it would naturally flow off through the opening. A small hose and a sponge will do the work quickly and well and under the circumstances more water can be used to facilitate matters and there is no unsightly mess remaining to be cleaned up. The same plan can be used in a bench form for smaller articles. Necessarily, the bench has to be stationary, as it is piped from the centre similarly to the floor arrangement. A bench table, say five or six feet square and eighteen inches high, having a slightly raised strip around the outer rim will be found right for the general run of smaller goods. The depressed top of this could be coated with a good hard cement instead of using the galvanized iron. The same idea could be used in the floor providing there were no vibration or shifting to cause cracks. This would depend on circumstances.

On furniture that is to have a polished finish, the rubbing machine can be used to do the rotten stone work, by having the proper felts attached, the final work being, of course, done by hand. It is always advisable to allow at least twenty-four hours time between the rubbing and polishing operations.

French polishing is an almost unknown art in our furniture factories, and at times it would prove very useful knowledge when a small article is needed in a hurry, as it can be taken, as soon as the filler is dry, and completely finished by a liberal expenditure of elbow grease, together with the proper materials. A soft pad, made with cotton batting, having a cover of cheesecloth, or some other suitable material of convenient size, is used. This is dipped alternately into raw linseed oil and fairly heavy shellac, and rubbed in vigorously, with a rotary motion over the surface until the wood is thoroughly filled and polished. An expert French polisher can make a very fine job, and the work is beautiful and lasting.

Small turned articles can be quickly finished in a lathe by this process.

All the better work in British factories is finished in this manner—that is, when a polish finish is required. For the average run of work here, the cost of finishing in this manner would be prohibitive.

Sanding and Finishing Panels

THAT the finisher is frequently "up against it" as the result of wrong methods in sanding is a fact well known to those who are interested in finishing room problems, writes Ballantyne Boyd, in Veneers. Very few outside the finishing room know to what extent the sanding and general cleaning up of veneered panels affects the quality of the final finish. Even a change in the grade of sandpaper used makes a difference in the depth of color produced by the stain.

If any one doubts the above contention, let him try the following simple experiment and convince himself. Take a piece of wood and draw a sharp plane across it, making clean, smooth surface. Then sand part of this surface with No. 000 paper and part with No. ½ paper; then stain the whole surface with the same stain. The result will be a revelation to the man who, heretofore, has not given attention to this phase of the work. He will find that the part that was only planed will be very light in color; that the part sanded with fine paper will be much darker than the part that was only planed; and that the part sanded with the coarse paper will be much darker than the others, and, in all probability, will not produce as clear and transparent a finish.

Absolute uniform results cannot be produced except under uniform conditions. This is a scientific fact demonstrated by the laws of nature. "Oak is oak," someone says, but take two pieces of oak grown on different soils and stain each with the same solution of bicromate of potash, and one will soon see that there is a vast difference in the nature of the two pieces. The conditions of soil and climate under which they were produced were quite different, consequently the results were equally so; and the difference in the woods resulting from the difference in the conditions under which they were produced are manifested when the stain is applied.

Only uniform conditions will produce uniform results. If we use fine paper for some work and medium paper for others and coarse paper for others, we cannot expect to obtain uniform results. The finisher must make his stain uniform. He cannot change his stain to suit the varying moods that may control the man who cleans up the wood; and even if he could it would be unreasonable to expect him to do so and compete with the man who is favored with uniform conditions.

But the fault is not always with the man who does the sanding. He cannot use fine paper when he has only a coarse grade. It is up to the stock department to see that the woodworkers do their work under uniform conditions; that they are supplied with a uniform grade of paper for each operation. It frequently happens that when one grade of paper runs low, the stock department thinks there is no necessity for ordering merely that one grade. Other grades can be substituted until such time as there is a necessity for ordering some of the different grades. But if the man who looks after the stock and does the buying could put himself in the place of the cabinetmaker or finisher, he would become impressed with the seriousness of the situation and change his mind regarding substitution.

Fine, fancy veneers are frequently seriously injured through being sanded with paper that is too coarse. Every effort should be made to preserve all the finer markings of these woods, and this can best be done by removing every sandpaper scratch. Unless this is done these scratches show up badly after finishing, especially if any stain has been used.

Coarse sandpaper should not at any time be used on fancy veneers, such as crotch and burl walnut. These should be scraped, either by hand or machine, preferably the latter, and then finished off with fine paper. This will make a much more uniformly even surface than when the veneer is cut down with coarse paper. The reason for this is that the scraper cuts evenly over hard and soft places alike, while the sandpaper cuts faster in the soft places than in the hard.

One of the beauties of a nice piece of quartered oak is the clear, transparent flake, but the finisher cannot obtain this unless the sanding has been properly done. Coarse sanding, or sanding across the grain or on an angle all tend to prevent this effect.

The First Aid Column

A department within a department to which Foreman Finishers and others are invited to turn for a solution of the practical problems encountered in their work. Readers are particularly requested to give the trade the benefit of their experience from time to time by replying to the questions asked. A number of new queries are to hand this month. They are given below. Be a live wire. Let us hear from you.

Finishing Red Gum

I should appreciate information on the following points in connection with the finishing of red gum. Which is the best surface finish when the wood is to be used for the interior finish? Should it be made bright or dull? What is the difference in the methods of producing the two finishes?

* * *

Red gum for interior finish will give the best satisfaction if finished dull. So far as the application of the varnish is concerned, there is no difference between a bright and a dull finish. To produce the dull finish the work is simply rubbed with a paraffine oil and pumice stone in the usual manner, and wiped off, when the surface will have the dull rubbed effect. The same effect can be secured, partially at least, by using a flat varnish—that is to say, a varnish that dries flat and looks like a dull rubbed finish. This, however, is not as smooth as the former, nor as good. If a polished finish is required, the necessary work in addition to the dull rubbed finish will have to be done. I am quite sure that the dull finish is in much better taste than any other for interior work.—**W. J. Beattie, Owen Sound, Ont.**

* * *

Red gum finished in its natural color will not fade. On the contrary, it becomes richer with age, and it is a most desirable finish for interior work. Another finish that is being used is a new shade brown which is a little darker than the natural color. Dissolve a quantity of walnut crystals in hot water, and then reduce to the desired shade. After the stain is dry, coat with bleached shellac, and then body up in the usual way for a dull rubbed finish. A good formula for finishing red gum is as follows: First, two coats of pure white shellac; second, two coats of clear rubbing and polishing varnish; third, allow each coat to dry thoroughly; lastly, rub down with pumice stone and

oil. This makes an excellent finish for interior work in furniture.

Here is a formula for rubbed polish finish: Raw linseed oil, one quart; light golden oil, one quart; water, one and one-third quarts; white vinegar, half a pint; butter of antimony, one quarter of a pint. Shake well before using. Some finishers include rottenstone with this formula. Rub with rottenstone if not included with the formula. This gives a good piano finish. There are various methods of producing a polish finish, by the use of rubbing oil, linseed oil and rottenstone, petroleum and sweet oil. A polish finish requires more labor than a dull finish.

The formula which I have given above for finished red gum is recommended by a well-known lumber and veneer company, while the formula for a rubbed polish finish is used by a leading furniture company in Grand Rapids, Mich.—**Albert Hudson, Hespeler, Ont.**

Pores Showing White

Is it possible to produce a Belgian grey finish on oak porch furniture without the objectionable white cast in the pores of the wood? I am constantly trying to overcome the difficulty, although a lot of this sort of furniture is sold with the pores showing white. Can any other finisher advise me of a way out of the trouble?

* * *

Try the following stain: One package of slate color Diamond dye used for making ink to one gallon of warm water. Use this stain in the usual way, sand, use a thin coat of shellac, and afterwards fill.—**W. J. Beattie, Owen Sound, Ont.**

Finishing Work Before Shipping

How much of the finishing is it advisable to do on a set of interior finish for an office before shipping it from the factory? The job we have in hand includes several partitions and doors to be assembled before shipment. The wood is oak, and it is to have a fumed finish. This is obtained by using an acid stain, and the surface will be shellaced and waxed. As the pieces will have to be carried to the site of the work by an ordinary express outfit we think it might be risky to finish the work right up before shipping, but we would like to do as much of the finishing as possible in the factory. This work is new to us and we should appreciate a few pointers on this part of it.

* * *

It is quite possible to finish this kind of work completely before it leaves the factory. If you have any doubts leave the waxing and wiping off until the work is in its final position; then if any accidents have occurred the parts can be touched up before the final operation. These, however, should occur only in connection with mitred corners, which might not meet exactly on account of unevenness of floors. With a little experience you will soon be able to anticipate these things.—**W. J. Beattie, Owen Sound, Ont.**

Committee: A thing which takes a week to do what one good man can do in an hour.—Elbert Hubbard.

Your belting cost may run unnecessarily high from buying inferior belts but it is more likely to be from some abuse of the belting in service.

Varnish Don'ts

Don't forget that it is friction caused by good, honest rubbing that hardens wax when applied as a finish for hardwood.

Don't forget that a quick-drying varnish was never intended for a good wearing "finishing varnish."

Don't forget that a quick-drying varnish used over a good "finishing varnish" will very shortly crack and break down.

Don't forget that varnish should never be applied over a gloss. Hair-cloth or sandpaper will quickly remove it, and also improve the general appearance of subsequent coats.

Don't forget that your varnish must be thoroughly dry before you can produce a successful job of rubbing with water or oil and pumicestone, or a polished surface with rottenstone.

Don't forget that each coat of varnish must be thoroughly dry before applying another. If this is neglected, cracking and crazing will surely result.

Don't varnish over an oily surface or foundation; cracking of the varnish is sure to follow.

The Discovery of Mahogany

LIKE the use of a great many of the factors connected with the arts and the sciences, the discovery of the beauty of the grain of mahogany for furniture was accidental, says a London contemporary. The story goes that a certain West Indian captain who had brought back to England some planks of mahogany as ballast, decided to give the wood to his brother, a Dr. Gibbons, then building a house in King Street, Covent Garden. But the planks were so hard that the carpenters objected, and the plan for using them fell through.

Some time later, Mrs. Gibbons wanted a small box made, and the doctor sent the mahogany to a cabinetmaker. In his turn the cabinetmaker objected to the hardness of the wood, but the doctor persisted so much in his request that the order was finally executed.

The finished box polished so nicely that the doctor ordered a bureau made of the same wood. The cabinetmaker displayed that in his shop window before delivering it. The Duchess of Buckingham saw it and begged enough wood from the doctor to have it duplicated, and mahogany furniture soon after came into favor.

The repairing of checks in veneers, after they have been glued up, is a tedious as well as painstaking job, if it is done so that it will not show up the imperfection. A simple method is to take any quantity of fine sawdust from the same kind of wood your defective piece is made of; put it in an earthen pan, pour boiling water over it and stir well. Then let stand for a week or ten days, occasionally stirring it. Then let it boil for some time and it will be of the consistency of pulp or paste. Put it into a coarse cloth and squeeze out all the moisture. Keep this on hand, and when some veneered stock checks, mix a sufficient quantity of thin glue in a desired amount of this mixture to make a paste; rub this well into the cracks or holes in your work. When this gets dry and hard, clean or sand off the stock. If this paste is filled in sufficiently tight in crack, nine chances out of ten the imperfection will never be noticed.

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Methods of Sanding Core Stock

SINCE many manufacturers have installed their own veneer departments for making built-up stock, a few remarks in The Furniture Manufacturer and Artisan on the subject of sanding core stock are of interest.

There are some good, and evidently a lot of erroneous, ideas about sanding and preparing core stock for fine face veneer work. We all know that in regular three-ply work there is no sanding or special preparation of core stock. In fact, the filler, back and face, is all put together at one operation, the filler going through the double glue-spreader and spread with glue on both sides, after which it is laid on the back of the panels, the face laid on top of the filler, and there you are, ready for the press. The only sanding is that which comes afterward in cleaning off the face.

But to make a really fine job with thin face veneer, one must have a separately built core, either three-ply or of a solid core body cross banded. Then, to make the best kind of a job, and reduce the danger of sanding through the face veneer in finishing, it is a good idea to put this stock through a sander. One authority says use No. 3 garnet paper, which is pretty coarse, and others use the same machines and paper that they do for the regular sanding.

The idea clung to for the coarse paper is that it serves in place of what the trade used to term tooth planing. Really, now, is there any use to rough up a surface to make glue stick to it? There is lots of room to argue on this point, and lots of the argument is foolish. There are plenty of good glue joints being made, with veneer cut just as smooth as the machine will cut it, and not a scratch or sand mark about it; there are lots of edge glue joints made where the lumber is just as smooth as it is possible to make it. So why rough up the wood to make it stick better? The main thing is to have it clean and free from dust, and give the pores time to open up to the moisture in the glue.

The great thing about the sanding of core stock before applying fine face veneer is in that it smooths the surface, takes the lumps and high places out, and the face veneer will then lie flat and straight. Perhaps the strongest point about the use of coarse paper is in that it will cut more freely and leave less dust than the fine paper.

After sanding it is important to get the stock clean and remove all dust. It is dust that often interferes with glue taking hold of wood, and it is perhaps easier to clean the dust from coarse, sharp sanding than from the work of finer paper. But it can be cleaned after any sanding if enough pains are taken, and this cleaning is of more importance than the grade of the paper.

For making holes in thin glass, put a piece of stiff clay or putty on the part in which you wish to make a hole. Make a hole in the clay or putty equal to the diameter of the hole you wish to make in the glass. Into this hole pour a drop of molten lead and a piece the size of the hole will drop out.

We have noticed that a number of people call poorly-varnished furniture "veneered goods," even when they are solid. It is a slur upon the veneer trade, for in some of the very best cabinet work made to-day veneers are used for the outside finish.

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Veneers and Panels

The Selection of Face Veneers

THE selection of the proper grade of face veneers by the plant operating its own veneering department, is of the utmost importance, both as regards the products and the final showing of profits in the veneering department. Right here is where, by the injudicious purchase of veneers, the gross gain can be materially reduced.

The duty of selecting and purchasing face veneers for the plant amounts to vastly more than merely placing the order with the salesman for a certain amount of this stock or that, or the yielding to the alluring temptation to purchase bargain lots of veneers, which may be offered from time to time, mostly by irresponsible manufacturers who cut the price to the lowest.

In the selection of face veneers there are several laws or regulations which must not be lost sight of. Relatively these have to do with the proper selection of the veneers as well as the relative values in the appearance of the finished product. In the purchasi of sliced or rotary-cut stock for face veneers it is always well to observe closely the manner in which it has been manufactured. This can be easily determined by a close examination of the right, or face, and wrong side of veneers.

A veneer in which the grain is unduly ruptured or uneven is not to be recommended for the best of face work. While its appearance may be all that can be desired, as far as the figure and color are concerned, it is the rupturing of the grain which has occurred by the careless cutting that would prove detrimental for any high-grade finished product, and it is safe to vouch that fully 75 per cent. of all the trouble with hair-line checks, after stock is veneered and in the finishing room, may be ascribed to this cause.

Time and again the glue room and finishing room foremen have blamed each other for being responsible for these checks, it hardly occurring to either that these checks are already present before either of them gets the stock. Strange to say, they are not discernible until the finishing coats are applied.

I have seen stock used for face veneers which was so loosely cut and in which the fibres were broken to such an extent that it looked as though a row of toothpicks had been glued together by means of a thin film on the back. Naturally this stock would lose, in sanding, the thin remaining film, and the result invariably would be a series of hair-line checks, the presence of which neither the glue or finishing room foreman could explain. They never seem to show up until the stain and varnish are applied.

The question as to the advisability of buying log-run veneers or dimension-cut stock should be settled by local conditions. Some plants purchase nothing but log-run veneers and cut whatever sizes they have orders for, while other plants prefer only dimension stock. Just at present there is a strong trend of opinion in favor of the log-run veneers; some veneer consumers, with only limited equipment, prefer to pay a higher price for dimension-cut stock than to be burdened with the purchase of additional machinery. In some instances the size of the plant would not allow the addition of more machinery. The matter of selection of either log-run or dimension veneers is a question to be judged according to existing demand and conditions in the plants in question.

In the selection of face veneers the widest range of values is found in the higher priced woods. This is true especially in the case of mahogany and Circassian walnut. It is here where experience counts in judging the relative values. Without any experience it is difficult for a man to know whether or not he is getting full value for the money expended, or whether he is getting a bargain.

The value of mahogany face veneers is generally judged by the care taken in cutting and the color and figure. Thus it sometimes happens that veneer which is properly and painstakingly cut and has a choice figure, will command a price up to 12c. and higher per square foot, while the identical veneer cut in a slipshod and careless manner would prove expensive if it could be purchased for 5c. per square foot.

In judging the values of quartered-oak veneers the figure or splash grain plays an important part, as does also the color and the percentage of sap on edges. Some time ago the demand was all in favor of the large flaked veneer. This, however, has of late been reversed, and the demand at present is all in favor of the smaller or medium-sized flaked veneer.

Circassian walnut generally ranks highest in price of any veneers, with the exception of a few very rare imported woods, such as vermillion and the like, this being due mainly to the fact that these veneers, as a rule, are of rare figure, whereas lots of the mahogany are of a very plain variety.

Plain mahogany, however, has a fairly uniform and stable value throughout the country. There are various figures that are found in the plain variety of mahogany, which have made it possible to practically standardize the same at a fairly well-fixed value. Aside from this, the selection of mahogany, or, in fact, of any face veneer, and the establishing of values, is a matter that calls for experience and a talent for judging figures, at the same time bearing in mind the possible appealing qualities of the veneers to the public after being converted into the finished product.

With gum veneers gaining in favor as a high-class cabinet wood, and their excellent texture and figure, it is possible to obtain as high a degree of finish and workmanship as in woods which sell for a far larger sum.

The veneer producers who are also making it a part of their business to trim, match and tape veneers to any specific sized panels desired, have naturally taken much of worry and responsibility off the veneer consumer's shoulders. When they add to the original price of veneers the cost of doing this work and the waste involved, their figures may seem somewhat high. Nevertheless, to the user of a limited amount

of veneers, it is cheaper to buy them ready matched, taped and sized than to do this work himself, as by getting the veneers ready to lay he only pays for what he uses, while in doing the work himself he has to allow a certain percentage for waste, matching, sizing and trimming.

It behooves the buyer of face stock to make an exhaustive study both as to the relative values and appearance of the different veneers used. And not this alone; the appearance of the finished product and familiarity with the demand of the public are essential to the proper selection of face veneers.—Veneers.

The Various Grades of Glue and How to Use Them

EVERY wood-worker has something to do with glue, consequently the great majority are more or less interested in the subject. This interest, says a writer in Veneers, is to some extent, intensified by the fact that to many it is most uncertain in its effects. Some men, when they use a batch of glue, worry about whether it is going to hold, while some others have become so accustomed to a certain percentage of their work going bad that they have ceased to worry, and live in hope that the last lot will not be worse than the one before.

Now, this ought not to be. When a man starts to use a batch of glue he ought to be as certain of the result as one could be of anything. To contend otherwise is to say that the manufacture and use of glue is a gamble, a lottery. The manufacture of glue is an exact science, and the same may be said of its use. To follow a definite course in the use of glue should insure, at all times, a definite result. But too frequently this is not the case—that is, the definite course has not been followed, and the results were not what were hoped for, taking for granted that the glue is O. K. to start with.

A man prepares a batch and uses part of it on one lot of goods and part on another. The result on one lot is all that could be desired, while on the other the result is most disappointing. What is the cause? If the cause is not in the glue, it must be in the wood. But why should the same batch of glue make a good job on one lot of goods and the very opposite on another lot? Because both lots of goods were not made of the same kind of wood, and there is really more difference between woods than there is between glues.

Taking for granted that no glue manufacturer will send out stuff that is unfit for use, and also that the glue has been properly prepared (in that it has not been spoiled in the operation), let us proceed, first, to a consideration of the various grades of glue, and, second, to a consideration of the use to which these different grades are adapted.

It is not possible for all animal glue to be of the same quality, at least it would not be wisdom to make only one grade, because to do so it would be necessary to mix the various grades, and this would mean a lowering of the higher grade. By doing this only a medium grade would be produced, which, while it might be suitable for some work, would be unfit for such work as calls for a high-grade glue. The different grades of glues are made at different temperatures. It is well to remember this when preparing the glue, also to remember that at no time is glue brought to the boiling point during the making.

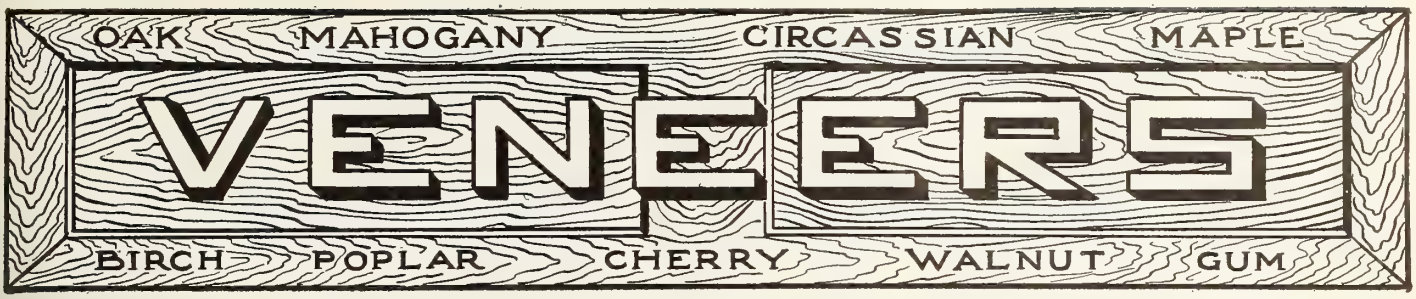
The gelatinous matter which makes the highest grade of glue is readily released from the raw material at a comparatively low temperature. This gelatinous matter, when released, is skimmed off by adding more water and slightly raising the temperature, this being repeated until no more gelatinous matter can be produced, each succeeding lot being a grade lower than the one before, and is usually a shade darker and is produced at a higher temperature.

These various grades of glue have their uses, and it does not necessarily follow that the highest grade of work requires the highest grade of glue. The fibre and texture of the wood is the thing that should determine to a very large extent the grade of glue used. For very hard wood the highest grade of glue should be used. This is because of the nature of both the glue and the wood—they are adapted to each other. First-grade glue requires to be used thin and hard. Close-grained woods require a thin glue in order that it may penetrate the hard surface and secure a firm grip. This applies to veneer as well as other joints. I know there are those who are satisfied to use a lower grade glue for veneering, but the writer has never been able to see the wisdom of their choice. The joint between core stock and veneer is as important as any other joint, and the rules or principles which govern the use of glue in one case should govern its use in the other.

Wood that is soft or porous does not require a high-grade glue. Glue for soft woods should be made thicker than for the harder woods, in order to prevent its complete absorption. At this stage the difference between a high and medium or low-grade glue is this. A high-grade glue may be used on soft woods, although I really believe that a medium-grade is better; while a low-grade glue, and quite frequently a medium-grade, cannot be used successfully on the harder woods.

The user of glue is frequently confronted with a difficult problem presented by the requirements of glue. He is frequently given the task of gluing both hard and soft woods together, and how can he prepare the glue to meet the requirements of these different woods A situation like that demands a compromise. As far as possible, glue must always be prepared to meet the requirements of the softer wood, and then the harder wood made to meet the requirements of the glue. At present there is no known way of reversing this order of things. There does not yet appear to be any way by which the softer wood may be successfully prepared to meet the needs of a glue suitable for the hardwoods. But we can raise the fibre of hard woods so that a glue of the consistency required for soft woods may get a permanent grip.

Years ago, this was done in some places by toothing with a plane made for that purpose, but it has been found that a much better job can now be made with very coarse sandpaper. For edge work the sandpaper block may be used, but for flat surfaces any of



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ENGLISH BROWN OAK,
CIRCASSIAN WALNUT,
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OAK, Plain and Quartered.
Sawed, 1-20, 1-8, 3-16, 1-4-in.
Sliced, 1-24, 120-in.
Rotary Cut, 1-24, 1-20, 1-16, 1-6.
POPLAR, YELLOW PINE,
BIRCH AND GUM
For faces, centers, backs, cross-banding and bottoms.

LUMBER

MAHOGANY,
CIRCASSIAN WALNUT,
AMERICAN (Black) WALNUT,
RED CEDAR.

PANELS

1-4, 5-16, 3-8-in. 3-ply and 5-ply, standard sizes.

HUDDLESTON-MARSH LUMBER CO.,

2256 Lumber Street
CHICAGO, ILL.

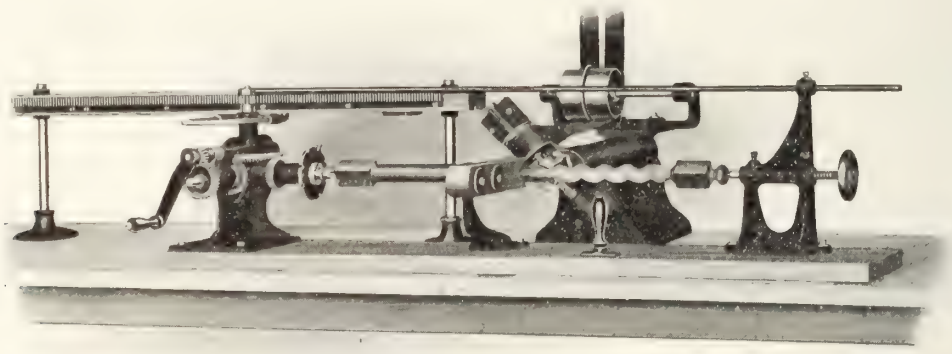
the big machine sanders are better. For a situation like this, a high-grade glue should be used and prepared a little heavier than would be required where all hardwood was to be glues up.

In the preparation of these different grades of glue be careful of the temperatures at which they are dissolved. The durability and adhesive quality of glue is determined, to a very considerable extent (if everything else is correct), by the temperature at which it is made. These qualities which, through care are preserved in the making, may easily be impaired by a lack of care in preparing the glue for use. As before stated, the highest quality of glue is made at a comparatively low temperature, and this fact renders it all the more liable to deterioration through excessive heat. The highest quality glue may easily be reduced to the value of a third-grade article by exceeding, to any considerable extent, a temperature of 140 deg. F.

Spiral Lathe Work

WOODWORK has "come back" in the furniture trade, to use a popular expression. There was a time when the rage for metal bedsteads and other furniture caused some falling off in the relative amount of woodwork in the furniture trade. For several years now, however, woodwork has been steadily gaining in favor as compared with metal, and incidentally there has developed, in connection with late furniture fashions, the employment of more than the usual amount of turned work.

Back in the early days of furniture making in this country turned work was the main thing, and there has always been a certain amount of it. However, during the rage for mission and other straight lines, and square corners in cabinet work, there was not much development in turnings.



Twist machine and sander manufactured by the Shawver Company, Springfield, Ohio.

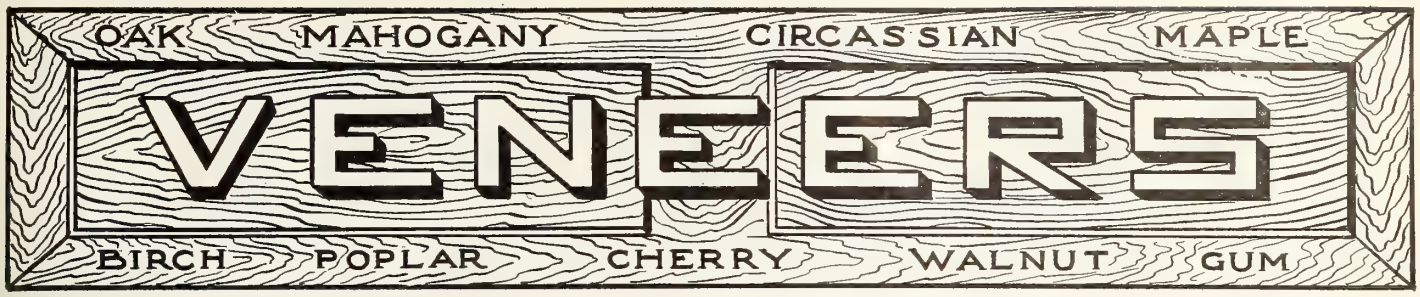
Of late years the taking up of period designs has led to a decided revival in the use of wood turnings, and at this writing the revival is gaining momentum. Conspicuous among these are twist or spiral turnings. One reason for this is that the spiral turned legs and spindles are a distinguishing characteristic of the Jacobean period in furniture, and this is a type that is very much in vogue now. The natural result is quite a variety of spiral turnings, including everything from the typical familiar rope twist to some graceful sweeping spirals, so lengthened in their sweep as to remind one of the twist fluting of the interior of rifle barrels.

Spiral or twist turning is a class of lathe work pretty closely related to fluting. Moreover, it is a fluting process, with the difference that, instead of the flutes running straightwise of the work, they are given a twist by the work being turned in the lathe automatically with the progress of the fluting tools. The ratio of the one to the other makes the length or sweep of the spiral, while the shape of the fluting tools determines the nature of the work.

The work of making fluted turnings consists essentially in first turning the article to round form or some pattern in the usual way, and then using a fluting or spiral attachment to cut the face into the kind of spiral or fluting design desired. The main difference between straight fluting and spiral turning is that for fluting a series of turns and stops are made, and the work is held rigidly, while the fluting is done straightwise of the stock. In spiral turning the work is automatically turned as the cutting or fluting tool advances at a rate to make the desired spiral shape. The styles vary from the short twist to the very long sweeping curves, and the shape is varied considerably also, just as moulding shapes are varied, though the range in variation is not so wide.

Different types of cutters are used to produce different sizes and shapes. These should be kept rigidly up to pattern and looked after carefully, so that they may cut clean and sharp. A roughly cut spiral turning is not a thing of beauty, and is somewhat difficult to finish off. There are special attachments for sanding spiral turnings, as well as attachments for cutting them. This branch of the woodworking trade is to-day not only one of the most interesting, but one that is quite popular and extensively used in high grade, high priced furniture where an excellent finish is required.

One may find twist turnings in some of the old cheap furniture, as well as in some of the cheap furniture of to-day. These are novelties, but they are not things of beauty. To make a thing of beauty out of a twist or spiral turning, the work must be performed carefully, the cutting must be clean, and the sanding and finishing done so thoroughly that the complete turned article will pass muster along with the best finished cabinet work. That is the kind of spiral turning that can be produced with the Twist Machine and Sander manufactured by The Shawver Company, Springfield, Ohio.



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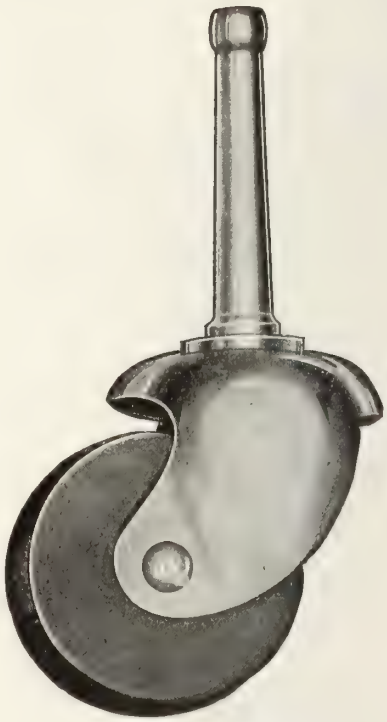
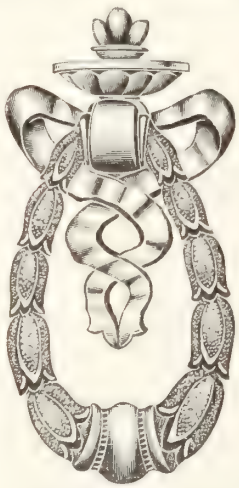
Our new Acme Casters, displacing our former pattern, are beautiful in style and finish and can be furnished in various sizes suited to the piece it is to support. They cost only a few cents more than poor ones.





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Send for catalogue No 73 or give us an idea of your requirements and we will forward samples.

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Meriden, Conn.

Canadian Representative: F. A. Schmidt, Berlin, Ont.

News of the Trade

Consideration is being given to the starting up of a new furniture factory at Megantic, Que.

The sash and door factory at Huntingdon, Fraser Valley, will resume operations in the near future.

Four Okanagan Valley (B.C.) mills are cutting steadily on box stock for the local canning companies.

At Montreal, the Amherst Furniture Company has been registered by M. Caplan, S. Caplan, and W. Shapiro.

The Winnipeg Cabinet Factory, Limited, Winnipeg, has assigned to C. H. Newton. There will be a meeting of creditors on August 22nd.

While operating a buzz saw at the Ball Furniture Factory, Wingham, Ont., E. Nash, an employee, sustained serious injuries to his hand.

Good progress is being made on the erection of a furniture factory for J. E. Baechler, Goderich Lumber & Milling Company, at Goderich, Ont.

Thos. Roussel & Son, Nightingale Street, Hamilton, Ont., recently lost their planing mill by fire. The loss, which was mostly machinery, amounted to $9,000.

R. D. Hall, Petrolia, Ont., intends to establish a plant for the manufacture of such products as clothes racks, farm gates, step ladders, cupboards and cabinets.

The London Woodworking Company, London, Ont., has been reorganized, and is now known as the London Art Woodworking Company, Limited.

The Moose Jaw Sash and Door Manufacturing Company, Moose Jaw, Sask., has been succeeded by the Moose Jaw Sash & Door Manufacturing Company, Limited.

The Canadian Office and School Furniture Company, Preston, Ont., are running full time again, and are busy on an order for five thousand shell boxes for the Government.

Mr. A. E. Clark, of Edward Clark and Son, Stair Building, Toronto, has been elected a member of the Inspection Committee of the National Hardwood Lumber Association.

The sash and door factory belonging to Zenon Charbonneau, Alice Street, Montreal, P. Q., was recently destroyed by fire, the loss amounting to $20,000, and the insurance to $7,000.

Chew Brothers' mill, Midland, Ont., which was shut down recently for a few weeks, is again in operation, and is expected to run twelve hours a day for the balance of the season.

The Big Four Furniture Company, of Calgary, has launched into the manufacture, as well as the sale of furniture. They made a display of more than usual interest at the recent Calgary Fair.

The rate-payers of Collingwood, Ont., defeated a by-law having for its object the loan of $20,000 to the Bryan Manufacturing Company for the rebuilding of their mills recently destroyed by fire.

The Berwick Planing Mills, Berwick, N. S., owned by J. W. Hutchinson, were destroyed by fire recently. The loss amounted to $10,000, and included a quantity of lumber. There was no insurance.

Z. Charbonneau, 3691 Alice Street, Montreal, P. Q., will rebuild his sash and door factory, recently destroyed by fire. The new building will be two storeys high, 65 ft. x 40 ft., and will cost $2,500.

The Paul Lea Woodworking Company, Moncton, N. B., have just completed extensive improvements to their factory in the shape of additions to the boiler room, engine room, office and general plant.

John Halter, of the Ellis Furniture Company, Limited, Ingersoll, Ont., suffered a serious accident recently when his left hand came into contact with a revolving knife while he was operating a machine.

We have the authority of the Shell Committee of the War Department for the statement that there are one hundred and twenty-five woodworking factories in Canada that are working on shell boxes only.

Daniel Knechtel, President of the Knechtel Furniture Company, Walkerton, Ont., has left for a five weeks' trip throughout the West. He intends to visit Edmonton, Lethbridge, Regina, and other centres.

A. D. Clingen, Martintown, Ont., estimates the loss of his saw mill, sash and door factory and dry kiln, recently destroyed by fire, to be about $11,000. There was no insurance. The lumber shed and practically all the lumber in the yard were saved. Mr. Clingen has not yet decided about rebuilding.

With a capital stock of $50,000 The Architectural Woodworking Company, Limited, has been incorporated at Toronto, Ont., by H. E. Gardner, N. B. MacNeilly, G. A. Williams, W. A. Riddell and H. Obee. The firm will manufacture and install office and bank equipment, store fixtures, revolving doors and refrigerators.

Frank Lovett, of The Canada Furniture Manufacturers, Limited, of Woodstock, Ont., has received the appointment of Inspector for the Furniture Manufacturers' Safety Association, his duties to extend all over Ontario. The appointment is the outcome of legislation passed by the Ontario Government in regard to the Workmen's Compensation Act.

On June 16th, at his summer home at Macatawa Park, Michigan, the death occurred of John Hoult, at the age of fifty-five years. The late Mr. Hoult served his apprenticeship in the furniture manufacturing trade with the Jackes & Hayes Company, Toronto, afterwards proceeding to Rochester. At the time of his death he was President of the Luce Furniture Company, Grand Rapids, Michigan.

The Canada Woodenware Company, of Toronto, are submitting a proposition to the town of Meaford, Ont., for the loan of $13,000 by a by-law to enable the company to take over and operate the now liquidated W. A. Moore Mantel Factory. The question of submitting a by-law to the ratepayers in this connection has been laid over until a future meeting of the Board of Trade and Town Council.

The Wilson Lumber Company, Limited, 1 Spadina Avenue, Toronto, who recently lost their dry kilns by fire, report that they have now been rebuilt. In rebuilding the kilns the company have taken care to install one of the best kilns in the country, having the walls 13 inches thick, and a concrete foundation. Both ends of the kilns are to be all doors, so that there will be no waiting or delay in either loading or unloading the trucks.

Andrew Malcolm, President of the Andrew Malcolm Furniture Company, Kincardine, Ont., died on August 9th at Kincardine. The late Mr. Malcolm was a native of Killearn, Stirlingshire, Scotland. He came to Canada in the year of Confederation, and went to Kincardine in 1874. The two large factories of the Andrew Malcolm Company at Kincardine and Listowel are standing monuments to his business enterprise. He took a deep interest in municipal affairs, and occupied numerous public positions. He served as Mayor on several occasions, and in 1898 was elected to the Legislature for Centre Bruce. Mr. Malcolm was 75 years of age. He leaves a wife, one daughter, and two sons. The two sons are Mr. James Malcolm, who is head of the Kincardine factory, and Mr. Andrew G. Malcolm, head of the Listowel factory.

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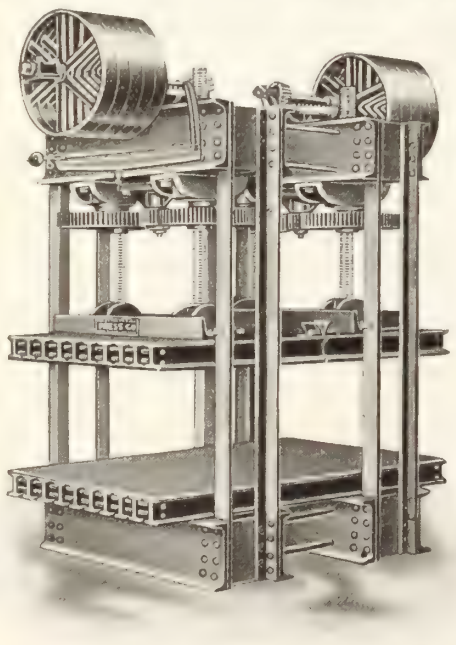

WRITE FOR BULLETIN C 1.

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18 Tansley Street, MONTREAL

We are beginning to be more reasonable in our views and to believe that a temperature best suited to man's requirements is, after all, best suited to the glue. This change of mind has resulted in making the glue room a pleasant place in which to work; as comfortable in point of temperature as any other part of the factory. And along with all this comfort has come a better quality of work. Let us remember that everything should be in harmony, and that when things look as though sacrifices are necessary on the one hand in order to produce good results on the other, there is usually something wrong, something out of joint that ought to be investigated. If we approach the matter with an open mind, we will be sure to find the cause of the trouble, and a general improvement will be the result.—The Woodworker, Indianapolis.

Making butter boxes from hoop pine is becoming a big business in Australia. New factories with modern machinery are starting. The locally made boxes are much cheaper than the imported ones. Australia exported $17,350,000 worth of butter in 1913.

SALESMAN'S POSITION

Salesman wanted, to call on the woodworking trade, one with some knowledge of glue preferred. Good opportunity Write in first instance to Box 20, Canadian Woodworker and Furniture Manufacturer, 345 Adelaide Street West, Toronto. 8-9

LUMBER SALESMAN WANTED

We want a man calling on the furniture trade to handle our hardwood lumber and veneers in Canada, particularly Ontario, on commission basis. If you are interested give full particulars of your connection. Box 19, Canadian Woodworker and Furniture Manufacturer, 345 Adelaide Street W., Toronto. 8

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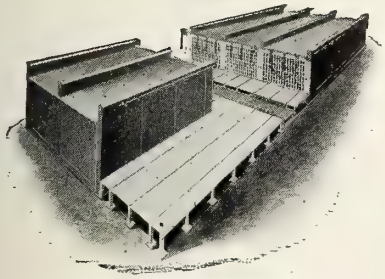

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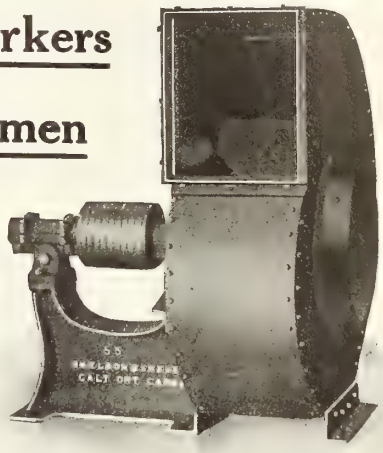

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The saw can be set to cut at any angle and can be raised or lowered 8 inches. This operation makes no difference to the belt as is the case with other makes of machines. There is no overhanging slide. The table is clear of all obstructions; all work is in full view, and is operated with 1½ h.p. Motor.

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Agents for Hamilton and District:
MESSRS. KENT GARVIN & COMPANY
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The Hutchinson Combination Woodworker

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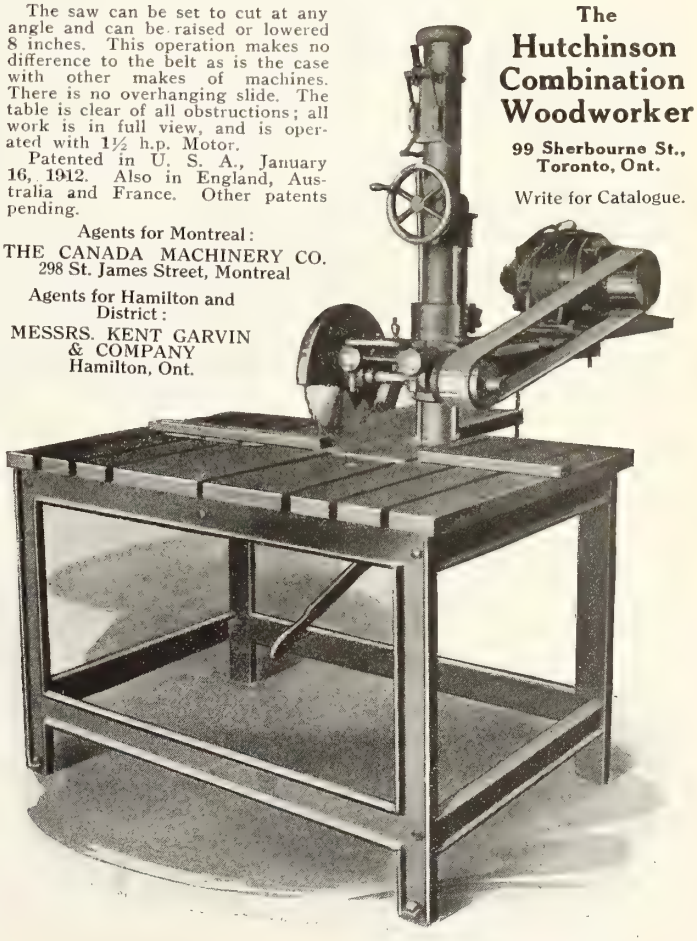

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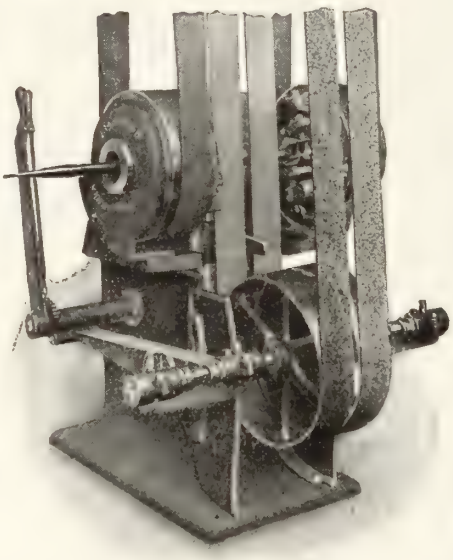

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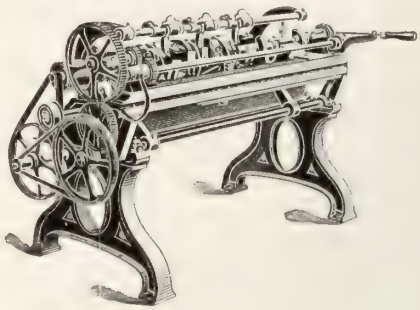

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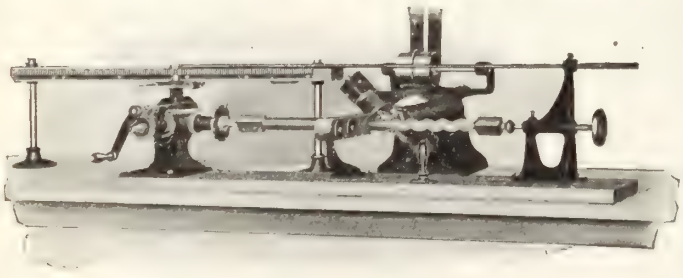

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The feed gear set gives one turn in 1½, 3, 4½, 6, 7½ and 9-in.

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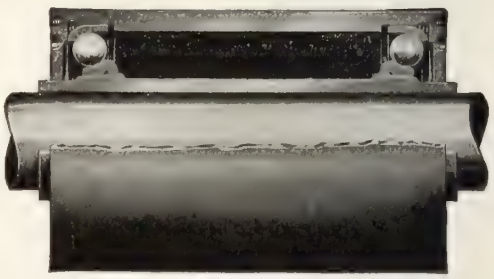

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	2 " 2" x 2"-30" Clear	COMPLETE STOCK	10 " 4/4 S. W.	
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OAK and RED GUM

OUR SPECIALTY

Our Gum comes from Arkansas—the Finest in the World—Nice Band Sawn Stock.

At our Tennessee mill we are producing some choice Band Sawn

Plain and Quartered Red and White Oak, Poplar

Prompt Shipments and High Grades our Hobby. **Mahogany** Let us quote you on your requirements.

The "Canadian Woodworker" Buyers' Directory

For Alphabetical Index see page 8

ABRASIVES
The Carborundum Co., Niagara Falls, N.Y.

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Company, Woodstock, Ont.

BABBITT METALS
Fay & Egan Co., J. A., Cincinnati, Ohio.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass

BAND SAW FILING MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Pryibil Machine Company, P., New York.

BAND SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Petrie, H. W., Toronto.
Pryibil Machine Co., P., New York City.

BAND SAW MACHINES
Berlin Machine Works, Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Williams Machinery Co., A. R., Toronto, Ont.

BAND SAW STRETCHERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

BELT LACER
Clipper Belt Lacer Co., Grand Rapids, Mich.

BENCHES
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

BENDING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
McKnight & Son Co., L. G., Gardner, Mass.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.

BLOWERS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

BLOW PIPING
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

BORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Pryibil Machine Co., P., New York.

BOX MAKERS' MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Co., Berlin, Ont.
St. Paul Machinery Manufacturing Co., St. Paul, Minn.
Whitney & Son, Baxter D., Winchendon, Mass.

BRUSHES
Meakins & Sons, Hamilton.

CABINET PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Co., P., New York City.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Curtis Machinery Corporation, Jamestown, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.

CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
Palmer & Sons, A. E., Owosso, Mich.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Curtis Machine Corporation, Jamestown, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.

COMBINATION WOODWORKER
Hutchison Woodworker Co., Toronto, Ont.

COOPERAGE STOCK
Sutherland-Innes Co., Chatham, Ont.

CUT-OFF SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Knechtel Bros., Limited, Southampton, Ont.
Ober Mfg. Co., Chagrin Falls, Ohio.
Pryibil Machine Co., New York.
Simonds Canada Saw Co., Montreal, Que.

CUTTER HEADS
Berlin Machine Works, Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

DADO HEADS
Elliott, W. A., Toronto.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

DOVETAILING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

DOWEL MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.

DOWELS
Knechtel Bros., Limited, Southampton, Ont.

DRY KILNS
Andrew Co., A. H., Chicago, Ill.
Grand Rapids Veneer Works, Grand Rapids, Mich.
Morton Dry Kiln Co., Chicago, Ill.
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

DUST COLLECTORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

EDGERS (Single Saw)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

EXHAUST FANS
Invincible Blow Pipe Company, Toronto.
Sheldons Limited, Galt, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

FILLERS
German-American Stain Co., Grand Rapids, Mich.
Marietta Paint & Color Co., Marietta, Ohio.
Schmidt Co., Walter K., Grand Rapids, Mich.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Whitney & Son, Baxter D., Winchendon, Mass.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

FLUTING AND TWIST MACHINE
Pryibil Machine Company, P., New York.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.
Delany & Pettit, Limited, Toronto, Ont.

GRAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto, Ont.

GLUE
Coignet Chemical Product Co., New York, N.Y.
Delany & Pettit, Limited, Toronto, Ont.
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
Palmer & Sons, E., Owosso, Mich.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.

GLUE JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio

GLUE ROOM EQUIPMENT
Boomer & Boschert Company, Montreal, Que.
Perrin & Company, W. R., Toronto, Ont.

GLUING CAMP CARRIERS
Billstrom, Nels. J., Rockford, Ill.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio.

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.

GUARDS (Saw)
Pryibil Machine Company, P., New York.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

HANDLE & SPOKE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Co., Sandusky, Ohio.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitby & Son, Baxter D., Winchendon, Mass.

HARDWARE SPECIALTIES
Reflector & Hardware Mfg. Co., Chicago, Ill.

HARDWOOD LUMBER
Archer Lumber Co., Helena, Ark.
Atlantic Lumber Company, Toronto.
Duhlmeier Bros., Cincinnati, Ohio.
Imperial Lumber Company, Columbus, Ohio.
Kosse, Shoe & Schleyer, Cincinnati, Ohio.
Kraetzer-Cured Lumber Co., Moorehead, Miss.
Luehrmann Hardwood Lumber Co., St. Louis, Mo.
Mowbray & Robinson, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Powell Myers Lumber Co., South Bend, Ind.
Prendergast Company, Cincinnati, Ohio.
Shiels & Company, Chas. F., Cincinnati, Ohio.
Spencer, C. A., Montreal, Que.
Wilcox & Knapp, Conneautville, Pa.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Black Bros. Machinery Co., Mendota, Ill.
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Knechtel Bros., Limited, Southampton, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.

KNIVES (Planer and others)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Galt Knife Company, Galt, Ont.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

MACHINE KNIVES
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MITRE MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

MITRE SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Co., Montreal, P.Q.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MOULDINGS
Knechtel Bros., Limited, Southampton, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.

PAINTS & VARNISHES
Marietta Paint & Color Co., Marietta, Ohio.

PATENT SOLICITORS
Dennison, H. J. S., Toronto, Ont.
Lightfoot, Stanley, Toronto, Ont.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shimer & Sons, Samuel J., Galt, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

PRESSES (Veneer)
Black Bros. Machinery Co., Mendota, Ill.
Perrin & Co., Wm. R., Toronto, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

RESAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

RIM AND FELLOE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

RUBBING MACHINES
Curtis Machine Corporation, Jamestown, N.Y.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Black Bros. Machinery Co., Mendota, Ill.
Curtis Machine Corporation, Jamestown, N.Y.
Duplex Moulding Sander Co., Hornell, N.Y.
Elliot Woodworker Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SASH, DOOR & BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Shimer & Sons, Samuel J., Galt, Ont.

SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SAW GUARDS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Pryibil Machine Company, P., New York.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Knechtel Bros., Limited, Southampton, Ont.
Pryibil Machine Company, P., New York.

SAW JOINTERS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SCRAPING MACHINES
Whitney & Sons, Baxter D., Winchendon, Mass.

SCREW DRIVING MACHINERY
Reynolds Pattern & Machine Works, Moline, Ill.

SCROLL SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.
Simonds Canada Saw Co., Montreal, P.Q.

SECOND-HAND MACHINERY
Pryibil Machine Company, P., New York.
Williams Machinery Co., A. R., Toronto, Ont.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pyribil Machine Co., P., New York.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Invincible Blow Pipe Company, Toronto, Ont.
Sheldons Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.

SPRAYING APPARATUS
De Vilbiss Mfg. Co., Toledo, Ohio.

STAINS
Marietta Paint & Color Co., Marietta, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass.

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STORE FIXTURES & FITTINGS
Reflector & Hardware Specialty Mfg. Company, Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

TABLE SLIDES AND TOPS
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

TRUCKS
Standard Dry Kiln Co., Indianapolis, Ind.
Sheldons Limited, Galt, Ont.

TURNINGS
Knechtel Bros., Limited, Southampton, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Whitney & Sons, Baxter D., Winchendon, Mass.

UNDER-CUT SELF-FEEDING FACE PLANER
Fay & Egan C., J. A., Cincinnati, Ohio.

UNIVERSAL WOODWORKING PLANER
Elliot, W. A., Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

VARNISH SPRAYER
De Vilbiss Mfg. Co., Toledo, Ohio.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

VENEERS
Central Veneer Co., Huntington, W. Virginia.
Cincinnati Veneer Company, Cincinnati, Ohio.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Dupre & Company, C., Toronto, Ont.
Evansville Veneer Co., Evansville, Ind.
Goshen Veneer Company, Goshen, Ind.
Haughton Veneer Company, Chicago, Ill.
Hoffman Bros. Company, Fort Wayne, Ind.
Huddleston-Marsh Lumber Co., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Strong Veneer Company, Jamestown, N.Y.
Waetjen & Co., Geo. L., Milwaukee, Wis.
Whisler, C. L., Hillsboro,' Ohio.
Wisconsin Seating Co., New London, Wis.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Black Bros. Machinery Co., Mendota, Ill.
Canadian Boomer-Boschart Co., Montreal, Que.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

WOOD FINISHES
Marietta Paint & Color Co., Marietta, Ohio.

WOOD TURNING MACHINERY
Berlin Machine Works, Ltd., Beloit, Wis.
Shawver Co., Springfield, Ohio..

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Jackson, Cochrane & Co., Berlin, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

WOOD SCREWS
Robertson & Company, P. L., Milton, Ont.

WOOD SPECIALTIES
Knechtel Bros., Limited, Southampton, Ont.

WOODWORKING CUTTERS
Galt Knife Company, Galt, Ont.

YELLOW PINE
Prendergast Company, Cincinnati, Ohio.

KNECHTEL'S

LIGHTNING CUT-OFF SAW

A few of the special features of this machine:—

Semi-automatic feed which is easily controlled by the operator;
Self-oiling bearings in which the saw mandrill runs;
Adjustable saw-guard which can be instantly shortened when cutting narrow material;
Adjustable gauges to cut various angles up to 45 degrees;
Tight and loose pulleys, 8 inch diameter by 4½ inch face;
Twelve inch saw with 18 inch cut;
Strong substantial frame with the entire machine self-contained.

Write for prices and information.

KNECHTEL BROS.
LIMITED
SOUTHAMPTON, ONT.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively.

Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.

Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

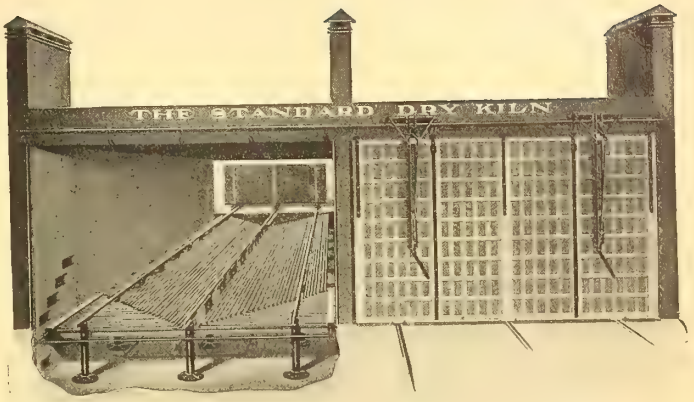
MADE BY

B. Walter & Company

Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887



Hardwoods are Easy for The Standard Dry Kiln

To understand fully how successfully fine hardwoods can be kiln-dried, you must see the splendid results produced by The Standard Moist Air System.

Control of the drying elements is perfect—and easy. There's nothing complicated about The Standard Kiln. Anyone can look after it. Write for catalog and list of hundreds of users. Address: The Standard Dry Kiln Co., 1560 McCarty St., Indianapolis, Ind.

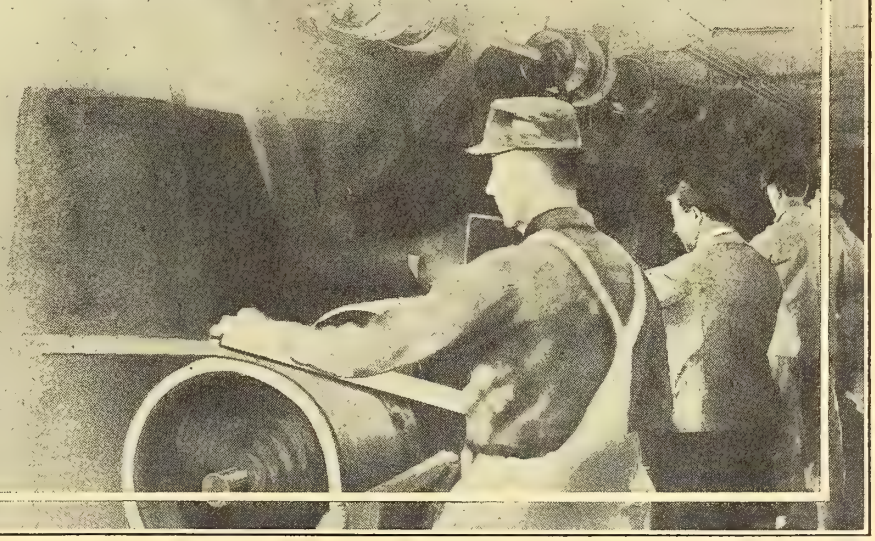
Get the Most Out of Your Sanding Equipment

EVERY wood-working plant has considerable investment in the sanding department.

You will realize more on the men and machines—get more work, better work, more uniform results if you see that they use Garnet Paper and Cloth that cut clean and fast—show long life, and are uniformly coated with pure, hard, sharp, Garnet grain;

in other words,

Carborundum Brand Garnet Paper and Cloth



The Carborundum Company
Niagara Falls, N. Y.

New York Chicago Boston Philadelphia
Cleveland Cincinnati Grand Rapids
Milwaukee

Where Your Finish Must Make Good

Look ahead, Mr. Furniture Manufacturer.

In the office or in the home, where your furniture must finally stand its bumps, is where your finish must make good if your business is to grow.

Finish your product for the future by using

Marietta Spartan Art Wood Stains

"The stains made with brains."

They are beautiful;
They are practical;
They are serviceable.

They never fail to make good in the crucial test of actual wear on the furniture of your customers' customers.

Send for sample panels.

The Marietta Paint & Color Co.

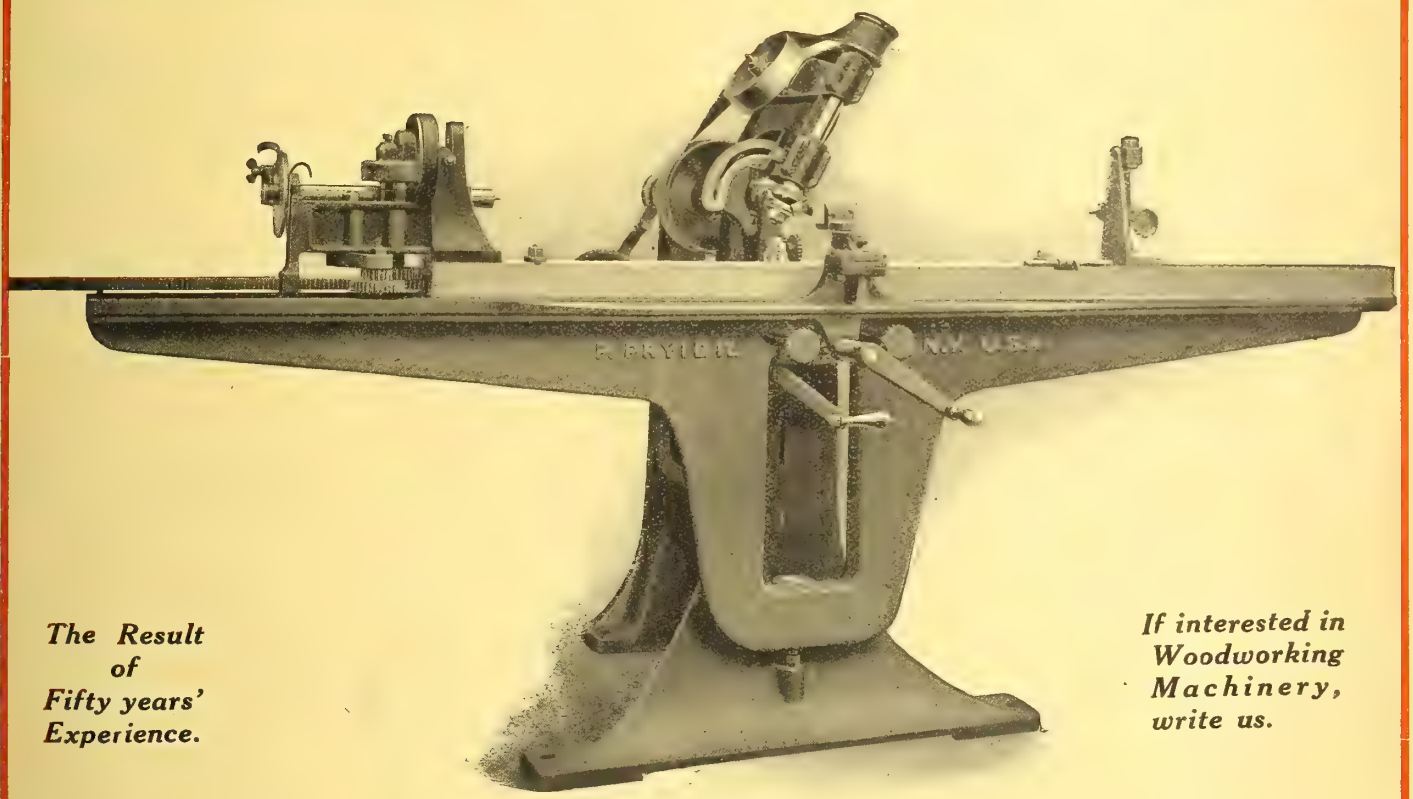
MARIETTA, O.

MARIETTA WOOD FINISH SPECIALISTS

Volume Fifteen TORONTO, SEPTEMBER, 1915 Number Nine

CANADIAN WOODWORKER and Furniture Manufacturer

Jacobean Twist Work



The Result of Fifty years' Experience.

If interested in Woodworking Machinery, write us.

This machine will produce all kinds of spiral or rope mouldings, either straight, tapered, curved or oval. It will make right, left, and pineapple cuts and will do straight and irregular fluting. It will cut from one to six threads on a piece, and will make any degree of twist from one turn in one and one-half inches of length to one in ten and one-half inches.

The cutters are similar in shape and arrangement to those used on variety shapers, and are made of the same steel. They revolve always in the same direction, whether the twist be right or left, and one set will produce several different shapes of work. Changing from one degree of twist to another, or from right to left, takes less than one minute. This machine will swing eight inches, and will take 5 feet to 10 feet between centres, according to length ordered.

A Medallion Fluting Attachment will produce radial fluting on flat work up to 9 inches square, or 6 x 12 oblong.

P. Pryibil Machine Co.

512-24 W. 41st. St.
New York City

Alphabetical Index to Advertisers, Page 8

"Leather like gold has no substitute."

"CROWN" Planer Belting

For Heavy Service and Small Pulleys

Running machines with slipping belts is like trying to cover ground on a tread-mill—a case of wasted energy.

Crown Planer Belting is specially constructed and finished to grip the pulleys. This belting is ideal for use on planers, matchers, etc., where it must take short turns over small pulleys.

The leather used in "Crown" Planer Belting, which we tan ourselves, is carefully selected and no weak spots are used.

The small pulley is the acid test of the construction, pliability and gripping qualities of a leather belt. "Crown" Planer makes good under such a test.

Write us for prices.

Established since 1876.

Made in Canada

Sadler & Haworth

Tanners and Manufacturers

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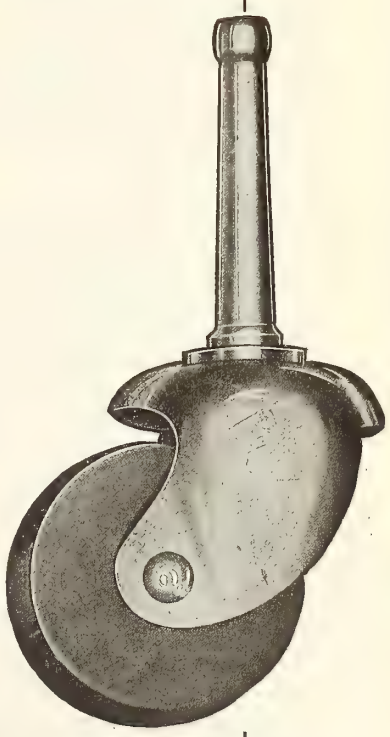

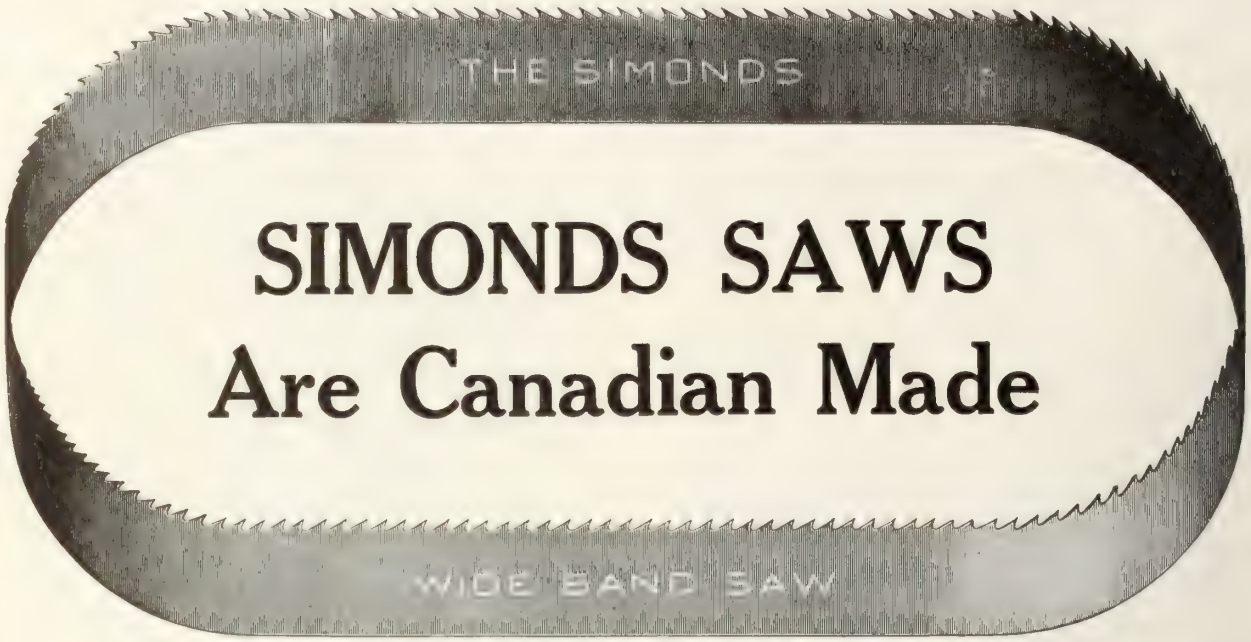

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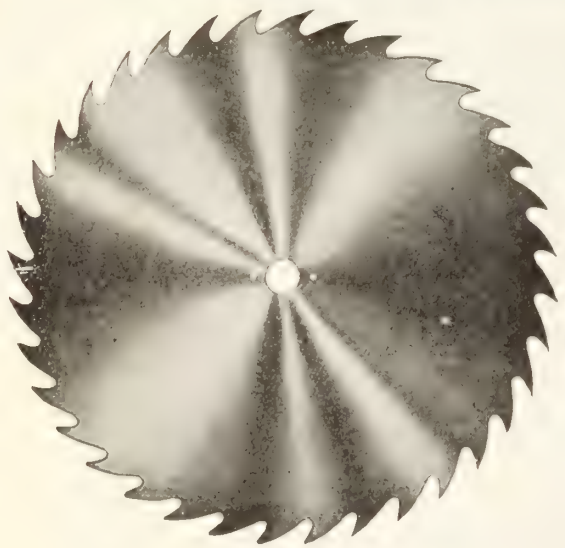

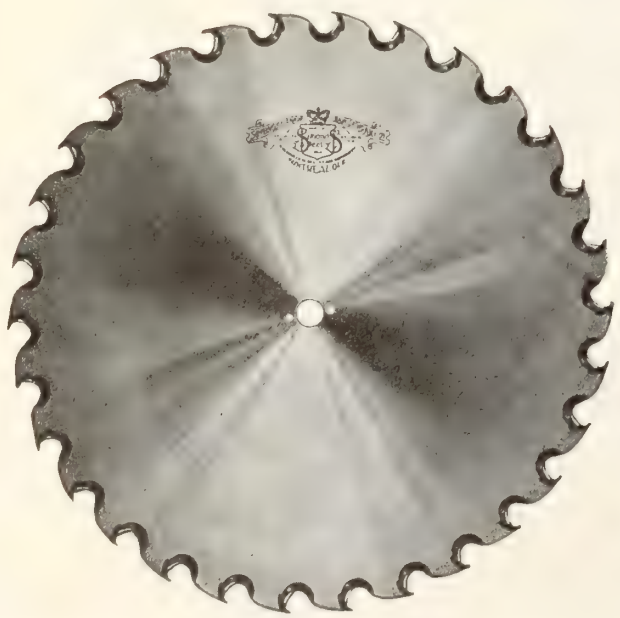

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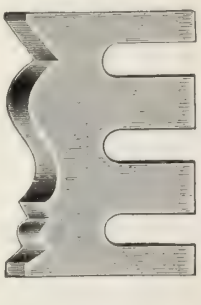

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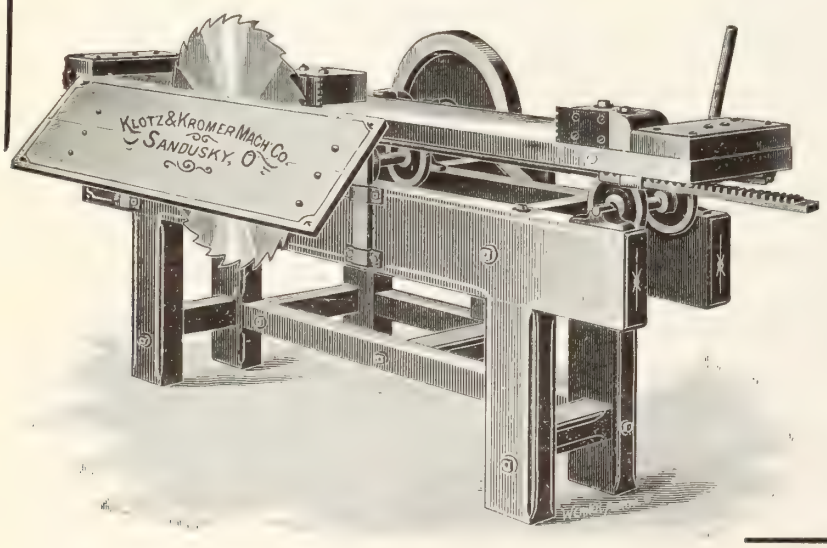

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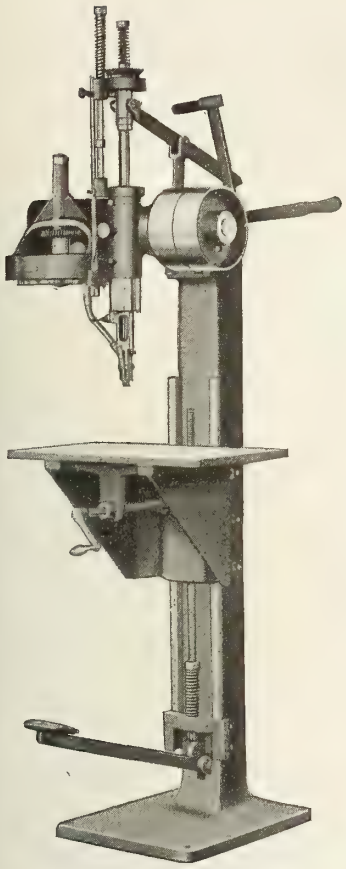

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Many Machines in Use in Canada.

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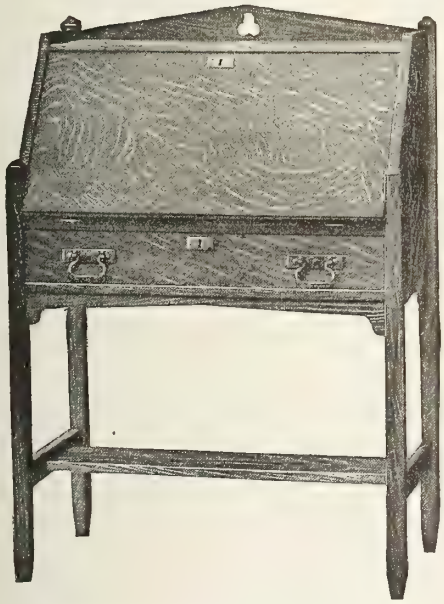

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Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

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Eight times out of ten, the trouble can be traced to improper kiln drying of the lumber.

The **Grand Rapids Vapor Kiln** dries lumber in a natural manner, expells the contents of the cells, and leaves the lumber plump in dimension and free from further appreciable shrinkage or swelling.

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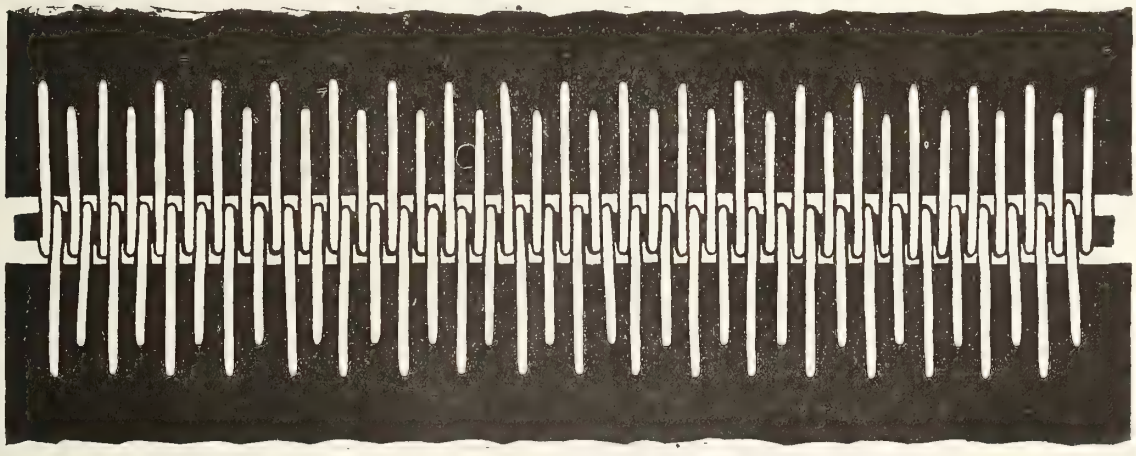

Each hook will stand a pulling strain of over 50 lbs. Equal to more than 350 lbs. per inch of belt.

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Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.**

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Woodworker Publishing Company, Limited

Branches: Montreal, Vancouver, Chicago, New York, London, Eng.

345 Adelaide St. West, Toronto
Phone Ade. 2700

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Vol. 15 **September, 1915** **No. 9**

Will the Demand for Shell Boxes be Permanent?

IN manufacturing circles people are beginning to ask whether the demand for war munitions will outlast the present conflict in Europe, the increased production of war materials in Canada having been particularly pronounced during the last six months. A year ago not a factory in the whole Dominion was turning out war munitions, while now the production of shells runs into seven thousand daily, with the output steadily increasing. The activity has been most marked in the manufacture of shells —a product in which woodworkers are interested by reason of the large number of boxes required to contain them.

The majority of those who are given credit for having reliable information in such matters say that the question as to the continuation of manufacturing war munitions is a problematical one, and that at such a juncture it would be foolhardy to venture an opinion. In spite of this asserted belief, however, it is remarked that the erection of new plants and the building of extensions to old ones is being carried out in a permanent manner. A passing phase of industry would call for temporary or inexpensive structures, but one which it is desired to establish and enlarge upon calls for modern brick or concrete and steel buildings—and these are being erected. This naturally suggests the belief on the part of war contractors that the industry they are engaged in building up will be a permanent one. It is estimated that the shell industry to date is worth 250 million dollars to Canada, while the profit is placed at ten per cent.

It is well for all branches of industry—but, as we have said, particularly the woodworking industry—to give some consideration to this latest development in Canada's industrial life, so that enterprising measures may be taken by those interested in subsidiary lines. When the Canadian Car and Foundry Company announced that they had closed a contract for eighty-three million dollars' worth of shells for the Russian Government many otherwise well-informed men would not give credence to statements regarding the proportions which the shell industry was assuming; but the fact remained that the Canadian Car and Foundry Company closed the contract, and that it was possibly the biggest thing in Canada's commercial history. Only a week or so ago the same firm closed fresh war business worth millions of dollars.

As long as the making of war munitions continues to be an important line of manufacture in Canada its effect will be felt in many other industries—notably in steel, copper, lead, zinc, and similar trades identified with it. But of the subsidiary industries woodworking is perhaps the most closely affected, by reason of the enormous amount of shell boxes required; so that the development of this business is one worth watching closely.

The Optimism of Advertising

TWO things make advertising almost a synonym for "optimism." One is that the advertiser who would be successful must be an optimist. The other is that when an advertiser loses his optimism he generally cancels his advertising.

"Business is rotten!" exclaims the manufacturer, and forthwith orders all his advertising to be stopped, little realizing that his own action is one of the causes that makes business "rotten."

Cancelling advertising is so easy that it is nearly always the first step toward retrenchment. The matter is seldom decided on its merits. It is impulse. Advertising must be "an expense," the advertiser reasons. Therefore to cut it off effects a saving.

The stoppage of advertising during times of stress and change has two bad effects upon the business involved. It turns off immediately a method of securing new business and holding old business. In addition to that, it advertises the pessimistic views of the advertiser, and therefore spreads his own lack of faith

An Appreciation

The Woodworker Publishing Company, Limited:

Gentlemen,—We are in receipt of the August number of The Canadian Woodworker, in which we found very profitable reading. The articles on Period furniture which you have been publishing have been most illuminating, and this last one on the Sheraton Art and Its Characteristics was well up to the general standard of excellence. The attention you are giving to the practical work of the furniture-making industry cannot fail to be duly appreciated by the trade.

Yours truly,

The George McLagan Furniture Company, Limited.
H. S. Robertson, Secretary.

Stratford, September 3, 1915.

in himself, his goods, his country, and the future to other business men who are, perhaps, also on the verge of doing the same thing.

The point is that the war will either end everything in the world or it will not. If it does not, business, among other things, must go on.

In the Dominion there are millions of us who must live and who must buy all the things that make life possible, and somebody is going to supply these things.

There are very few articles that we cannot make or produce. We have now an opportunity to find out what we can do. All of these new resources will develop business and that activity which ultimately results in good times.

Every manufacturer who has been in the habit of advertising and who can get materials from which to manufacture his goods, ought to push on with his method of selling goods, advertising included, just as in normal times. If he is a real advertiser he will realize that at such a time his competitors will probably relax their efforts, and that therefore he should make a corresponding advance in his.

The Jacobean Style*

Written specially for The Canadian Woodworker by James Thomson

ELIZABETH of England on a certain day in the year 1603 lay dying—a not very elevating or inspiring spectacle, if history tells the truth. She had met something that could be neither browbeaten nor bought. "If she broke the silence, it was with a flash of her old queenliness. When Robert Cecil asserted that she must go to bed, the word aroused her like a trumpet." "Must!" she exclaimed—

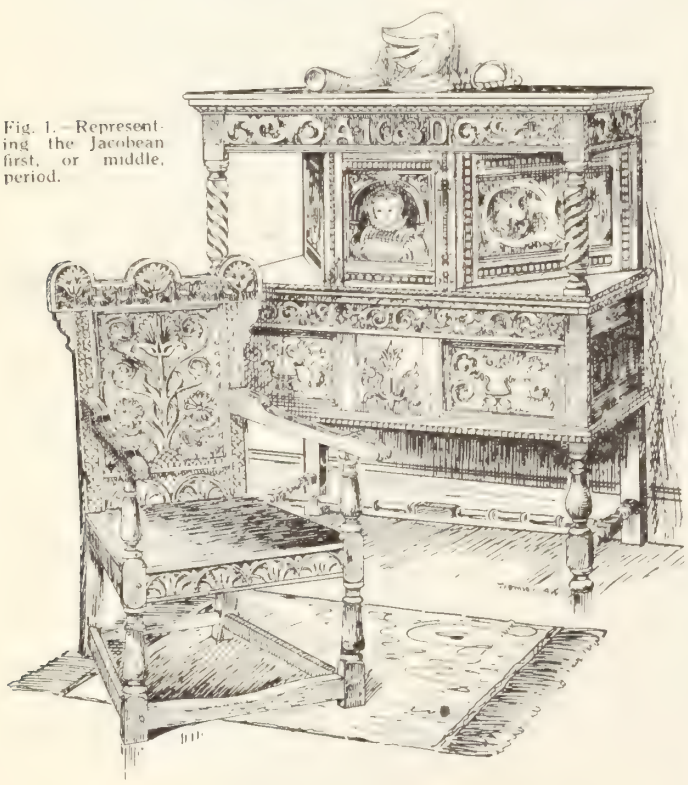


Fig. 1.—Representing the Jacobean first, or middle, period.

"is must a word to be addressed to princes? Little man, little man, thy father if he had been alive durst not have used that word." Then as her anger spent itself, she sank into her old dejection. "Thou art presumptuous," she said, "because thou knowest I shall die." She rallied once more when her minister beside her bed named Lord Beauchamp, the heir to the Suffolk claim, as a possible successor. "I will have no rouge's son," she cried hoarsely, "in my seat." But she gave no sign save a motion of the head at the mention of the King of Scots. Quietly the following morning the Virgin Queen passed away.

In accordance with "the motion of the head" (though it sadly went against the English grain), a virtue was made of necessity, and the son of that Mary Queen of Scots whom Elizabeth had sent to the block became James the First of England in addition to being James the Sixth of Scotland.

Jacob and James have the same meaning in Hebrew—a circumstance giving rise to the name "Jacobean" as descriptive of a period in which the Stuart monarchs held sway. The period had beginning with the ascension of James I. in 1603, ending with the deposition of James II. in 1688. It covered the time of James I., Charles I., The Commonwealth, Charles II., and James II.

Names of kings and queens are used to denote historic periods, but arbitrary division between styles cannot thus be made, for the reason that there is usually a transitional period when changes are in process but nothing has become fixed. Many notable historic mansions built shortly after the advent of James I. are in this transitional style, though classed as Elizabethan.

The influence of kings and queens has been great in fixing styles—an influence both direct and indirect. To find favor in the eyes of the reigning monarch has ever been the desire and endeavor of architects and designers. The immence ruff worn by Elizabeth is said to have inspired the many radiating ornaments to be found in the style bearing her name.

The Jacobean style was but a modification of the style of the previous reign. It was, however, free

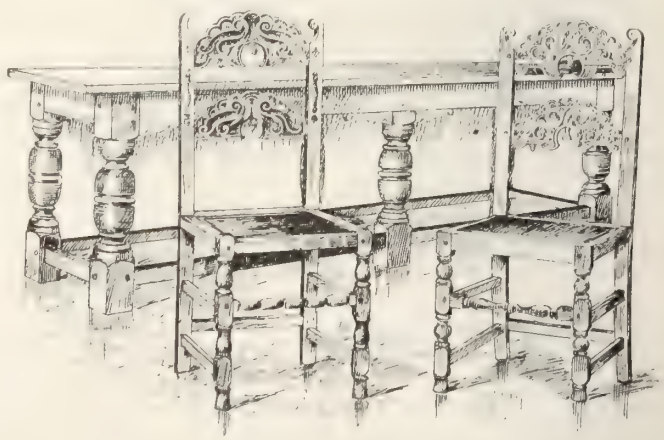


Fig. 2.—Refectory table and chairs of the same period as shown in Fig. 1.

* This article brings to a close a series which has covered the Chippendale, Heppelwhite, Adam, Sheraton, and Jacobean styles. Previous articles relating to the styles in the order named appeared in the February, June, July and August issues of The Canadian Woodworker.

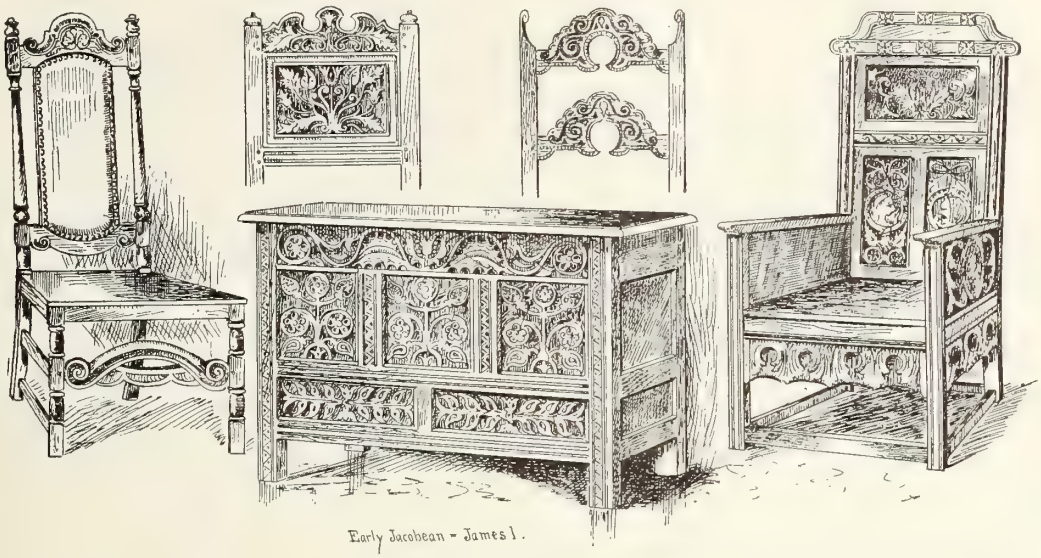


Fig. 3.—Early Jacobean examples.

from many Elizabethan vagaries and extravagences. It passed through various phases in its eighty-five years of vogue. In its simplest and best form it pretty accurately typifies the thought and feeling of the plain people of Seventeenth Century England. Whatever of flamboyance there is in the product is due to foreign influence. As the Puritans in the reigns of James the First—the same plain folk—constituted something like three-quarters of the Protestants of the realm, their influence on the architectural and decorative impulses of the age must have been considerable. The well-to-do Puritans were, many of them, well disposed towards amusements such as the play and recreation of an outdoor nature. Col. Hutchinson, a typical Puritan and an officer in Cromwell's army, is described by his wife as "loving dancing, fencing, shooting, hawking, was a charming musician, had good judgment in painting, sculpture, architecture, and the liberal arts, he delighted in books, gardening, and in all rarities."

Some Puritans, however, of a late day, under the influence of odium and persecution, became a most unlovable set—grim, fanatical, austere, and averse to all beauty and display. Under a perhaps ridiculous exterior, there in the Puritan lay a man of good natural capacity, sound sense, ripe scholarship, and ready wit. The influence of such a character on the decoractive thought of the time can be imagined.

In the King, James I., "the wisest fool in Christendom," was another figure of ridiculous aspect. There was nothing of froth or frivolity about him, though he sanctioned unseemly revels at Whitehall. A classical scholar, it is reasonable to suppose his tastes for the classics extended to environment of a domestic kind. The purer classic feeling that began to be manifest in interior woodwork and furniture, and which in process of time culminated in the architecture to which has been given the name "Georgian," may have received impetus from the seventeenth century intellectuals of which the King was one.

At all events, a classic feeling dominated the architectural and decorative endeavors of the England of the middle of the seventeenth century. In Christopher Wren was an architectural genius well grounded in Italian practice. The oldest part of London had been destroyed in the Great Fire in the reign of Charles II. The new buildings were many of them in the semi-classic taste. Grinling Gibbons, English born, but partly of Dutch extraction, a master carver both in stone and wood, came on the scene. In him Wren found an invaluable coadjutor. While Wren was trained in the classical school of Palladio, Gibbons in his style rather favored the naturalistic order of decorative effort. A combination of the two is to be found in late English Seventeenth Century furniture and woodwork.

The salient features of the Jacobean woodwork are simple, straightforward honesty of construction, an avoidance of curves as structural factors, appropriate ornament in the way of carving or inlay, the carving always being cut in the solid, and, in work of a late period, much mitring of mouldings, the latter being of neat, refined character. Sometimes light in appearance, but in general heavy beyond all need, the furniture is always sturdy and strong, the means by which it is held together being always visible. A product as individual as the sturdy men responsible for it, a piece of Jacobean furniture amongst modern mediocrity is

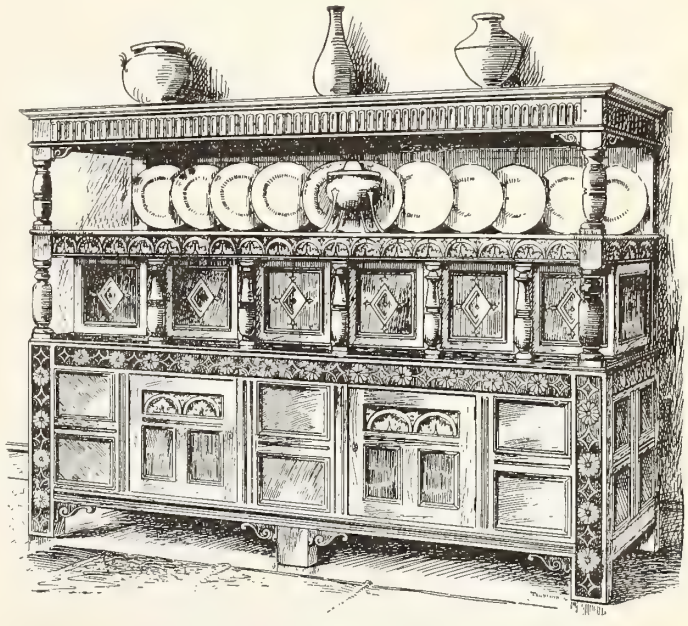


Fig. 4.—Jacobean cupboard in Kildwick Hall, Yorkshire.

Fig 5.—Chairs of the James I period.

Fig.—11.—"A fashion of chair that had some vogue."

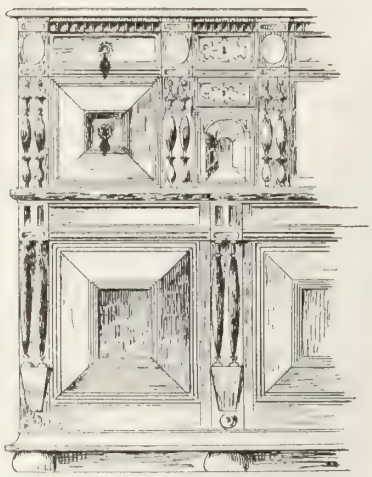


Fig. 6.—Jacobean cabinet 1665.

bound to catch the eye. Mortice, tenon and pin securely hold the joint in close embrace. Carving is sometimes in very low relief or incised; in other cases it is bold, and though roughly executed, very effective. Turned parts are sturdy, and not infrequently large-membered. All this is descriptive of the Jacobean product at its best, before it came under the influence of Continental ideas of a detrimental nature. The many fine English Seventeenth Century interiors testify to the truth of this. Capacious mantels and much high panelling of semi-classic design are to be found in the north of England.

Once the King (Charles II.) had come into what was called "his own" again, the rule "everything goes" was the order of the day. In high and exalted circles vice ruled, but the mass of people remained at heart puritanic. Godliness amongst followers of the King became a byword of scorn. Sobriety in dress, in speech, in manner, was flouted as the mark of the detested Puritan. The King in his Continental exile had acquired among other luxuriant tastes a love of show and glitter. To him of course the severe puritanical furniture did not appeal. It was a product for barn and outhouse rather than for the palace. Elaborately carved and very gaudily upholstered chairs and sofas, always with the crown worked into the embellishment, were plentiful at Court. At the palace of Whitehall the King's sometimes vulgar and ignorant mistresses no doubt had their tastes consulted in the selection of furnishings. The impress of all this is to be found in some Jacobean furniture of the time.

On the other hand, to this period must be assigned a vast amount that was good. Many very beautiful chairs after Continental ideas are attributed to the time of the Merry Monarch. Chairs with very high, and sometimes more than usually narrow, backs made their appearance. Cane seats and cane backs had considerable vogue. Flemish taste predominated in chairs, day lounges, settees and sofas, with curiously contorted arms and intricately scrolled cabriole legs. The turnings, sometimes spiral, sometimes plain, give main support to the finely conceived backs. The Charles II. chairs shown in Fig. 9 are excellent examples of a class of seat designed on Flemish idea.

Flemish and Dutch taste in the Jacobean output of the woodwork kind is dominant. From the one come the carvings, and from the other the exaggerated bulbous table legs and cabinet supports. Flemish merchants had long done a thriving trade in furnishing English mansions of the better class. An attempt was made to put a stop to it by law.

The close of the Stuart period saw an invasion of classic decorative feeling which did much to banish the earlier crude carving. To this year belong semi-classical mantels, cabinets, and also chests of drawers of

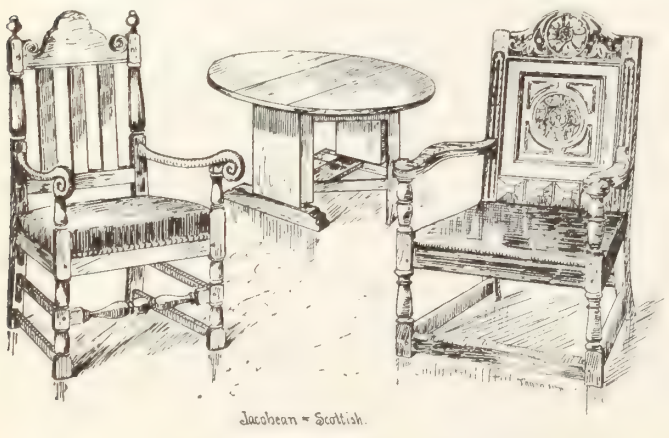


Fig. 7.—A few Scottish examples.

Fig. 8.—Late Jacobean types.

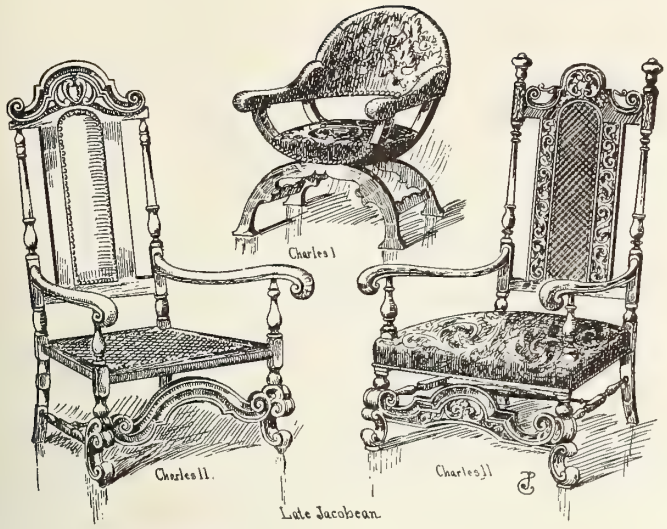


Fig. 9.—Chairs of the Charles I and Charles II period.

the kind shown in Fig. 8. Very refined mouldings, most intricately mitred, many a time constitute the sole attempt at decoration. High panelling of interior walls, too, was frequently in this most expensive style, for though the result is plain, to attain it is a costly experience, because of the numberless mitres.

Figs. 1, 2 and 3 may be said to represent the Jacobean first or middle period. The refectory table not very long ago brought 230 guineas at an auction sale. A set of five chairs brought 50 guineas. As may be noted, the two chairs shown herewith are not precisely alike in design. Uniformity made small appeal to the carvers of the time, the panels of a cabinet very often differing the one from the other.

The remarkable court cupboard shown in Fig. 4 is of the James I. period. The original is in Kildwick Hall, Yorkshire, England.

The chairs shown in Fig. 5 are probably of the same period, though differing in type. The chair on the left is a most admirable example of the rush-bottomed variety.

In Fig. 7 we have some notable Scottish examples. Constructional idea is reduced to elementary principle in the very odd craftsman-like table. The chairs, too, are as fit from the utilitarian point of view as they are admirable in design.

When stone floors were more common than they are to-day the cross rail connecting the front legs of a chair was placed low to the end so that the feet might rest there. Note how in the chair on the right the wood has been worn away by the footgear of the centuries.

In Fig. 10 is shown what in days of old was called a "withdrawing table." The top being of double thickness, when the under end pieces were drawn out to the fullest extent the main top dropped down to their level.

The cabinet in Fig. 6 exemplifies a fashion that obtained wherein carving was totally eschewed, and split turnings upon plain surfaces in part furnished the decoration.

Fig. 11 shows a fashion of chair that had some vogue. Sometimes the legs were square and the back as high as the shoulders of the sitter. In ancient MS. dining-room chairs of this type are to be seen. At a late period the overstuffing of seat and back seems to have been much favored. Very clumsy chairs after this style, but with cabriole legs, are to be seen in many of Hogarth's interior views. By the time of Queen Anne curves had replaced the straight line, but the "overstuffing" idea remained.

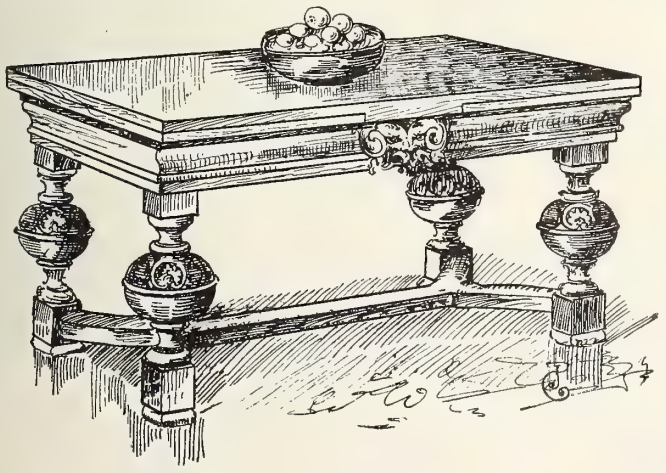


Fig. 10.—"Withdrawing" table.

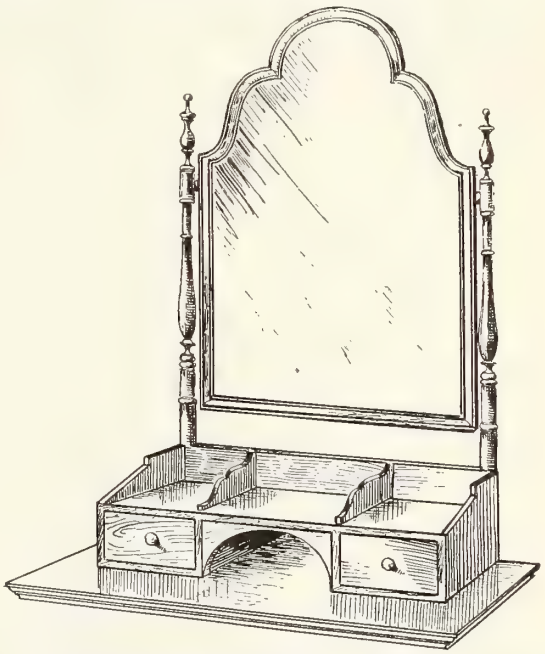


Fig. 12.—Toilet glass seen in Hardwick Hall, England: An example of the light, graceful work of the period.

It has been the commonly accepted opinion that the recent high prices of Circassian walnut are due to the difficulty of bringing the logs out through countries engaged in the war; and there is no question that the price is greatly influenced by that fact. A recent report from the British consul at Poti, in the region where the walnut grows, makes it appear probable that the wood's price would have advanced if there had been no war, because of the actual scarcity of merchantable trees and the increased cost of bringing the logs out of remote districts, where they must now be sought. The price of logs at the shipping ports has increased nearly one hundred per cent. in the last two years.

Mr. George Kersley, late manager of the Dominion Mahogany and Veneer Company, Limited, Montreal West, has decided to open offices and stock rooms on his own account in Montreal and Toronto, in the same line of business. His present address is 34 Brock Avenue S., Montreal West, P. Q.

Care and Use of the Cabinet Scraper

THE cabinet scraper is one of the most elusive of tools. It is practically indispensable in preparing the surface of wood for sandpaper, for under ordinary conditions it is difficult to prevent tearing the grain with a smoothing plane, causing "grain lifts" which cannot be removed easily with sandpaper. These and "jumps" caused by the unskilful beginning and ending of strokes of the smoothing plane will disappear under skilful manipulation of the scraper.

A scraper may be made of a broken saw blade, but as it should be of harder and tougher steel than most saws, it is generally better to buy one made for the purpose. It should be of a size which may be grasped easily, say between 3 in. and 3½ in. wide and about 5 ins. long, and sufficiently flexible to respond to the endeavors of the worker.

Many woodworkers sharpen a scraper by simply filling its edge to the form shown in Fig. 1, making it bevelled or square, as indicated in Fig. 2. In this condition a scraper is only partially sharpened, as the workman has stopped short of the part of the process which gives the tool its highest efficiency. The edge should be oilstoned until its corners are perfectly keen; then with a burnisher, one or more corners should be "turned" until they appear similar to either of the sketches in Fig. 3. This can be known by feeling with the thumb rather than by eyesight, though the best proof is to try the cutting quality of the edge. If it has been skilfully turned, it will cut a clean shaving and not tear the surface of the wood as will edges like those shown in Fig. 2, which are simply filed or oilstoned.

A burnisher for the purpose of sharpening scrapers may be made of an oil file, or of any suitable shaped piece of fine highly tempered steel, ground and oilstoned perfectly smooth. A chisel, used as shown in Figs. 4, 5 and 6, is quite satisfactory. As the scraper may cut into the burnisher if the latter does not slip over its edge, either one or both may be lubricated by being drawn over an oily rag.

The first attempt at sharpening a scraper should be made upon one with a bevelled edge, as good results may be attained more easily than upon a square edge.

The principle applied in burnishing or turning the edge of a scraper may be understood by studying Figs. 4, 5 and 6. The top view, or end of the scraper, h, j, of Fig. 5, and the numbered lines at right angles to it, represent that view of the angles and strokes of the burnisher while held as shown in Fig. 6. In the front view, the edge of the scraper is shown by m, n; the line k, l indicates the approximate acute angle n, o, l with the edge of the scraper. As this acute angle is the essential element of the entire process, it must be maintained. Note the dotted lines in the front view, Fig. 5, as these indicate the edge of the scraper to be turned and the corner of the chisel burnisher to be used. If the burnisher is carried at about this angle, with a firm and even pressure the entire length of the edge in the direction indicated by the arrow, the particles of steel composing the corner will be pushed over into the obtuse angle, l, o, m.

The angle of the first stroke 1, 1 should be the same as the bevel of the scraper; the second stroke 2, 2, made at right angles with the face, should usually be enough to finish turning the edge of a bevelled scraper, the stroke 3, 3 rarely being necessary. Repetition of these strokes will generally do little good, as the edge may be obtained by one stroke at each angle.

If a square edged scraper is being sharpened the process would be the same, excepting that the stroke 1, 1 would be omitted, 2, 2 being the first stroke and 3, 3 the second; the bevels of the stroke must be carefully maintained and a somewhat heavier pressure is necessary. If the burnisher is carried around too far, or the stroke has been made unskillfully, the edge may be turned too much. Often this may be remedied by holding the scraper as in Fig. 4, and carrying the end of the burnisher under the edge in the manner indicated. This will turn the edge back so that a light stroke made at 3, 3 in Fig. 5 will give a satisfactory edge. After the scraper has become dulled by use, its edge should be turned back preparatory to resharpening, by laying it flat upon the bench, cutting side up. The burnisher should be placed horizontally in contact

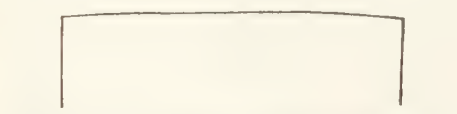


Fig. 1—How Some Woodworkers Sharpen a Scraper.

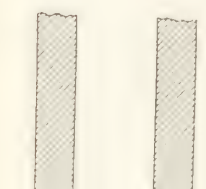


Fig. 2—A Beveled and a Square Edge.

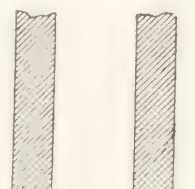


Fig. 3—Showing How the Corners Should Be Turned.

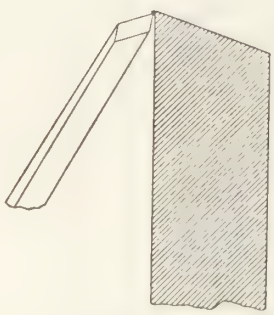


Fig. 4—Showing How a Chisel May Be Used As a Burnisher.

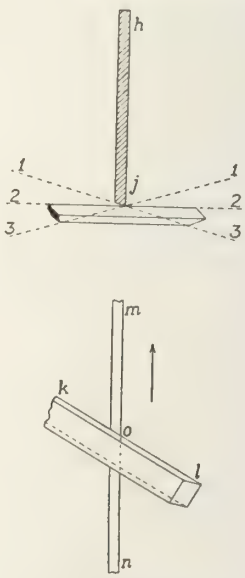


Fig. 5—Details of the Operation.

with the uppermost side of the scraper, bearing slightly upon the cutting edge. A few strokes back and forth lengthwise of the scraper in the direction parallel with the edge will frequently restore the original corner. By turning this corner over again another working edge may be obtained. Often this will be unsatisfactory, in which event it will be necessary to file and resharpen again.

A little practice will be necessary to acquire the touch which will give the best results both in sharpening and using the scraper. The angle with the surface of the board at which the tool should be carried depends upon the angle at which the edge has been turned, and can only be decided by trying.

In Fig. 7 is shown a common method of grasping and using a scraper. The left hand maintains the angle and pulls forward, while the right hand applies sufficient force downward and forward to cause the tool to cut as deeply as may be practicable. The hands may be changed and the cut made in the opposite direction. It will be seen that the force of the stroke is concentrated upon cutting a shaving of medium width, instead of endeavoring to make a cut as wide as possible. The worker will soon learn to grasp the tool in the way by which he can accomplish the most satisfactory results.

While either may be used for any purpose within the scope of the tool, the former is more suitable for

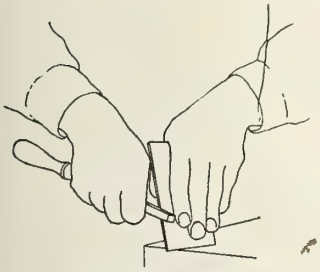


Fig. 6.—How to hold the burnisher.

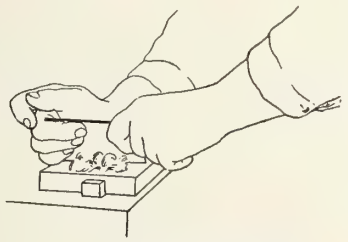


Fig. 7.—Usual way of holding a scraper.

flooring and other coarse work, as a coarser edge may be obtained. The square edged scraper, having a finer edge, is better for use upon the better grades of cabinet work, furniture and inside finish.

The trouble across the sea has hit the export of clothespins hard. Even the Australians are not buying as many as formerly. It might be supposed that Germany would be one of the last places for trade in American clothespins; yet, before the war, large quantities were shipped there. That trade has been wholly lost. The chief supply of clothespins comes from the hardwood districts of eastern states. Beech is the favorite material, but birch, maple and others are much used. The small article is made by machinery in large numbers, and it is a mystery what becomes of all of them. Attempts to manufacture them from sawmill waste have not been altogether successful. The odd sizes of waste cannot be handled by machinery, and it has been found more profitable to use good lumber than to work up waste. Certain firms, however, have recently inaugurated the manufacture of clothespins from types of mill waste on what promises to be a successful basis..

Don't forget that a strictly "finishing varnish" was never intended for a "rubbing varnish," nor is a strictly "rubbing varnish" intended for a "finishing varnish."

A Little Chat About Sandpaper

THE name itself is really a misnomer, as no sand enters into the manufacture of so-called "sandpaper." The material used is either crushed flint rock or quartz. Flint rock when fractured presents the sharpest edge procurable and therefore becomes of commercial importance as a grit. If we take the trouble to examine natural sand through a microscope, we will find that it has a rounded appearance, absolutely lacking the sharp cutting edges that a grit for sandpaper use should possess. This condition has been caused by the particles of sand rubbing against one another for countless ages.

We hear the expression "flint" paper and "garnet" paper. Garnet paper is made from garnet ore, which is procurable both in the United States and abroad. It is not quite so sharp as grit made from crushed flint rock, the particles fracturing in right angles. However, the edges are more durable and retain their cutting efficiency longer than flint grit. This explains why garnet paper proves more durable than flint paper when used on a drum sanding machine on hard or gummy woods.

In preparing flint or garnet ore for eventual use in the manufacture of sandpaper, the material, in the form of large chunks, is passed through crushers. These are graduated so that as the ore passes from one crusher to another it is gradually reduced in grain size until the proper size is obtained.

The crushed ore is then conveyed to sifting rollers which are hollow and covered on the outside with bolting cloth. The material passes into the interior of the rollers, or cylinders, and all the particles of sufficient smallness pass through the bolting cloth and are conveyed to vibrating separators. The material that is too large to pass through the bolting cloth passes on through the hollow roll, out at the opposite end from which it entered and back to the crushers.

We have often noticed that the grain in a piece of sandpaper is practically uniform in size. Of course there is some variation, but the uniformity in size is approximate. This uniformity, or regregation of grit of different sizes, is accomplished when the material passes through the vibrating separators.

All kinds of sandpaper, emery paper and emery cloth are made in rolls as large as those used in the printing of a big city daily. The process is continuous to the extent that while the paper is still coming from the roll at one end the finished product is being re-rolled at the other end.

The brand, together with the manufacturer's trademark, is printed before the grit is applied, by running the paper through a roller press. To apply the grit the paper is dipped into the glue, which is applied very hot. Rubber buffers prevent the glue from spreading to the other side of the paper. The paper then passes through a shower of grit of the proper size, the surplus grit falling off by gravity at the first turn of the paper over a cylinder. To thoroughly cement all the particles of grit a further coating of a thin solution of glue is applied.

The paper then passes over hot driers and is finally rolled into large rolls at the out-end of the drying section. Incidentally the steaming paper as it dries gives out anything but a pleasing odor. The average woodworker would hardly like the job of working

around one of these machines. The paper is afterwards cut, in a machine, to the sizes desired.

Sandpaper differs widely in quality, as any operator of a sanding machine will verify. To determine the quality of sandpaper tear it from each edge. Good paper will not tear straight. Neither does it tear cleanly, but the fibre pulls away, leaving an irregular edge. This characteristic should be the same no matter which way the paper is torn. When bent the paper should give a sharp, crackling sound. The best grade of paper will not shed its grit, even though bent sharply together.

A test of a somewhat more severe nature is to rub two pieces of the same paper together, surface to surface. Of course the paper will give up much of its grit under this test, but really good paper will hang on to its grit in a most tenacious manner. Beware of the paper that rapidly loses its cutting surface under this test.

Sandpaper does not take kindly to moisture, and if you have your paper standing around in a moist place the glue will become softened and when used the paper will quickly lose its cutting surface. Therefore keep sandpaper in a dry place, away from an open window where there is a possibility of it absorbing moisture from the air.

Have you ever had sandpaper get so dry that it crackles when you go to place it on the drums? The next time this happens, moisten the back of the paper. The trouble will then be entirely overcome.—Furniture Manufacturer and Artisan.

The One Best Way to Line Up the Sander

Contributed by H. Van Earl

THE importance of keeping the sander perfectly lined-up has been pretty well driven home by numerous articles appearing in the various trade-papers. But the fact that nearly everyone of these instructions disagree, has probably caused some confusion to those on the lookout for quicker, better results in lining up. While each of these methods is right in the main, inasmuch as the desired results are secured in the end, they vary greatly in effort and time required. As it is obvious that these various ways are the result of individual opinion in the different factories, it might be of advantage to learn what the manufacturer of these machines told the writer on this disputed point, and compare the efficiency of their method with that of your own.

In the first place, when approached in the right way, lining up the sander is a simple, straightforward series of operations, and not the tedious, uncertain task that some make it.

There are four general ways to set about this work, each varying into different branches as the work progresses. Some use one long straightedge, some add a short straightedge to this, some use a long stick with a nail stuck in near one end, and some use two long straightedges. This latter way is the best as it is easily the quickest. However, few use it on account of the cost of the extra straightedge. This cost is relatively slight, as the time saved soon pays for the extra outlay. The only excuse for the stick and nail method is that it saves the cost of straightedges altogether, and is handy to rig up at any time.

Before starting the complete line-up, feed and drum belts should be removed, for when the various screws are loosened, the pressure of belts is apt to pull fine adjustments out of line. Now that this is done, the line-up should be made in the following order—bed plates, drums, bottom feed rolls, top feed rolls and pressure rolls. Two straightedges are to be used, so that the entire line-up will be made without changing the original position of the straightedges, thus saving the time wasted and the accuracy lost in constantly shifting straightedges from side to side when but one is used.

The method now is as follows, and the straightedges are long enough to reach from in-feed plate to out-feed plate. After first lowering drums below bed level, each straightedge is laid edge up lengthwise with the bed of machine, two or three inches from ends of plates. If the machine is set-up level, lining up here should never be necessary, as these plates fit rigidly into the machine frame and can only work out of line if holding screws are not tight. However, if this rare condition does occur, place cards between each bed plate and straightedge, eight cards being required in all. Adjust each plate from alternate sides until the cards are all held equally tight. Then draw the screws up and test the cards again to make sure the tightening has not drawn one end of any plate higher than the other.

Next pull out the cards without changing the position of the straightedges. Loosen the two set screws in the stud of each drum box, and turn the screw that the studs rest on until each end of the drum felt firmly touches the straightedge. Draw up the set screws all around and your drums are in line. It is better to make line-up with felt than with sandpaper, because the paper might be a little loose.

Now insert the eight cards as before, leaving straightedges in the same position. Loosen the wedge screws at each side of the feed-rolls on the lower frame, then turn the adjusting screws which are just below the wedge screws to the right to raise the feed rolls level with the straightedges. Tighten the wedge screws to lock adjustment, and put the feed belt back on. The feed rolls are now lined up with drums and plates at a level the thickness of the cards above them, which is their correct average feeding level.

You are now ready for the upper adjustments. Go about these exactly as on the lower. Pull cards from under straightedges as before, and place them on the upper edge of straightedges in such position that when the top is brought down both feed and pressure rolls will rest just above them. Then line-up feed rolls first. Raise or lower each end of these rolls by means of the adjusting screws placed directly over the rolls on top of movable frame, so that the rolls will hold all cards equally firm. In this adjustment, as in all the others, lowering one end of whatever you are lining-up may slightly change the level of the other end, so that it may be necessary to make several minute changes after the first general level is made. For this reason nuts should never be locked until both sides exert equal pressure. Adjust pressure rolls next by the same method just used; then put paper and

drum belts on. Turn power on, letting your machine run free for a few minutes to be sure bearings and everything are in good shape.

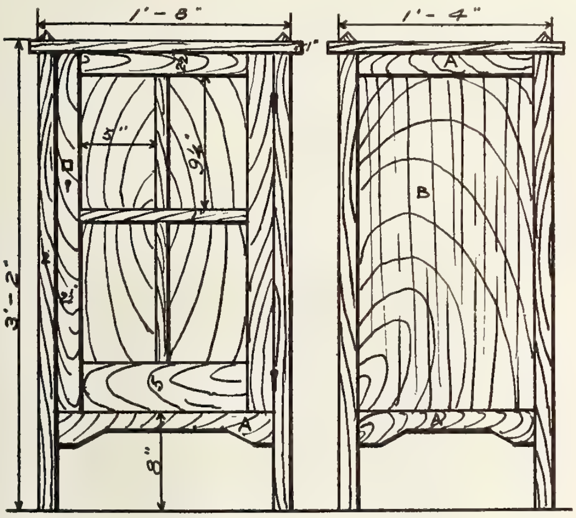
Now make final adjustments or levels according to the stock to be run. Lower drums to level of cut, as they probably will be too high, having been levelled with the felt. If heavy stock is to be sanded, raise feed rolls the least bit, and always control your pressure rolls so that they can be stopped by a firm hand grasp.

If correct line-up is made and adjustments do not stick, the trouble can be remedied by taking up thread or bearing wear by means of take-up collars provided. In split-boxes, substituting thinner oil felt will take up a certain amount of wear. Men are likely to forget about these take-up collars, as they are seldom required to use them until after running the sander steadily for five or six years. With alignments all correct and fast, successful results are now up to the operator and should be secured easily.

A Simple Problem in a Music Cabinet

By Hugh H. Chambers

THE music cabinet illustrated herewith is made of oak and matches the mission pianos so much in vogue to-day. It stands 38 inches high, 20 inches wide, 16 inches deep and contains five shelves an equal distance apart. The four posts are 2 inches square by 39 inches long. The



Details of cabinet.

cross pieces AAA are mortised into the posts, but before mortising they are rabbeted together with the posts to receive panels B, also the back, which is ⅜ y. p. ceiling. They should be rabbeted ½ in. deep to receive the panels, which are ¼ in. thick, and allow a strip of ¼ in. thick being nailed in to hold them in place. The top is made of a ⅞ in. board 17 ins. wide extending 1 in. over all around. If impossible to procure a board that width it will be necessary to dowel and glue two pieces together to make it. The posts extend 1 in. up through the top, as shown. The door is made of 1⅛ material with 2½ in. stiles and 5 in. cross rail at bottom. It also has one panel rabbeted in same as the sides. After this is done, oak strips ⅜ x 1 in. are put upon outside as shown, which divides it into four panels. These strips should be planed down until they come to a level surface with the stiles. The shelves are made of white pine or cypress, resting upon pieces of ½ x ⅜ strips screwed to inside of cabinet.

The following is a list of material required: 8 ft. ¼ x 12½ for door and side panel; 14 ft. 2 x 2 for posts; one piece 1 x 17, 22 ins. long for top; 8 ft. ⅞ x 3 for AAA; 7 ft. 1⅛ x 2½ for door; 7 ft. ⅜ x 12 for shelves, white pine; 6 ft. ⅜ y. p. ceiling for back; cost $1.85. 1 pair brass butts, 2 x 2, 15c; 1 lock, 15c; 1 pint wood dye, 30c; ½ lb. wax, 30c; total cost of material, $2.65.

The Belt Surface

BELTS should get a mechanical grip of the pulleys they run on. Their surfaces should be clean and smooth, and the whole substance of the belt should be pliable right through. This uncovers the whole secret of the object of applying "dope," and it also shows what is required of the "dope." It must be clean, and must penetrate the leather easily. The belt surface must not be left sticky. A sticky belt wastes power because it tends to follow the pulley around, instead of leaving it in a tangent common to both pulleys. The ideal belt fits closely to the face of the pulley for its full arc of contact, but does not tend to travel further around the pulley than this. Similarly, a hard, stiff belt uses up power in bending around pulleys. A belt in this condition does not get such a good grip of the pulley either, since its stiffness prevents the little hollows in the surface fitting close to the pulley. A new belt of fairly heavy stock must run a long time before the entire surface becomes polished on the pulley. Thus, the only use of "dope" on leather belts is as a lubricant, and rosin or other sticky stuff applied to the surface of the belt cannot possibly be defined as a lubricant. Perhaps it would have been better to have said "the use of 'dope' in leather belts," since the surface of the belt should be free from all kinds of matter whether greasy or sticky.

Black walnut still retains its high rank as a gunstock wood in spite of the large demands being made upon the supply. It is reported that a big New England arms factory with large foreign orders is combing the country for walnut and paying fancy prices for it. The search for a substitute for walnut gunstocks has been only partially successful and is not likely to cut much of a figure in present war contracts as there is little desire and less time to experiment. Red gum has proved entirely satisfactory for .22 rifles and other small arms, but it is claimed to be unsuited for larger guns, and particularly for automatics.

An English trade paper says that the wooden coat hanger business has been greatly affected by the war. These have been sent to England in large quantities in the past from Germany. They should be made of hardwood and they are chiefly sold in two or three designs. For the usual circular-shaped hanger, which can be bought by the public as cheaply as two cents each, German manufacturers have quoted a c.i.f. price to the importer of $1.12 per gross.

In 1912 the United Kingdom imported staves worth $4,681,290; in 1913, $4,866,733; and in 1914, $2,706,095. The importations of furniture woods, hardwoods, and veneers for the same years were respectively valued at $10,283,186, $14,164,705, and $12,872,818.

Pro Patria

EVERY branch of the Canadian woodworking industry is represented over and over again in the various training camps throughout Canada and Great Britain and on the battlefields of Europe. We are proud of this fact and have no intention of hiding the light of the industry under a bushel; so that in presenting our readers to Captain Harvey B. Evel, of the Evel Casket Company, Limited, Hamilton, Ont., we give them a cordial invitation to send us photographs of their friends on military service, giving such reminiscences and biographical data as may be found interesting.

Captain Harvey B. Evel.

Captain Harvey Buchanan Evel, who is now at Caesar's Camp, Shorncliffe, England, is the second son of Mr. J. J. Evel, of Hamilton, and is Treasurer of the Evel Casket Company, Limited, manufacturers and importers of undertakers' supplies. For many years Capt. Evel was in the 91st Highlanders Regiment, Hamilton. He enlisted for overseas service under Colonel Ashton in the 36th Battalion, C. E.F., when they mobilized at Hamilton, and left for England in the middle of June.

Captain Evel's example is one which will appeal to readers of The Canadian Woodworker. In its special line of manufacture the Evel Company is one of the best known firms in Eastern Canada, and the career of its representative now on his way to the front will be followed with interest.

The Excelsior Industry

THE makers of excelsior in the United States consume 100,000,000 feet of wood a year in the production of this commodity. Its use has greatly increased in recent years. Formerly it was in demand principally for certain classes of upholstering, but it is now in use chiefly as packing material in place of straw to protect crockery and fragile castings from breakage. It is superior to straw for that purpose. It possesses greater elasticity, and when the question of handling is considered, it is often cheaper.

Excelsior consists of thin, narrow shavings or ribbons of wood cut by machinery from bolts of short length. The bolts are placed in the machines and the ribbons are cut lengthwise with the grain of the wood. The machine is provided with a battery of knives which slit or score the surface of the bolt with parallel cuts whose distance apart determines are width of the ribbons which are shaved off by a second knife.

Different grades of fineness are cut by regulating the distance the slitting knives are spaced apart, and the trickness of the shaving cut off. The extra fine grades are called wood wool and have been used as a substitute for lint or absorbent cotton. However, the usual grades are much coarser.

The selection of wood for excelsior is important. A number of kinds will answer, and a number of kinds will not. The wood must be soft and thoroughly dry. It must be elastic and tough. A wood which in the bolt or billet may not be considered tough, may be wholly satisfactory when sliced in narrow ribbons. Cottonwood is of that kind. Ordinarily, it is neitrer strong nor tough; but the thin shavings or ribbons do not easily break, and they are quite elastic. It can be readily understood that if the fibres of excelsior break and splinter, the product loses much of its value. A number of woods that are light and soft are not suitable for excelsior because the fibres break too easily. Chestnut is such a wood.

Excelsior is more saleable if the wood is of light color. It has a better appearance. Light weight is likewise desirable. When it is used as packing for goods to go by freight, express, or parcel post. the weight of the packing must be paid for as well as the weight of the merchandise, and every pound saved adds to the profit.

The trees of the cottonwood group, including common cottonwood, aspen, and balm of gilead, are the most important in the excelsior industry.

There is not much waste in an excelsior operation. Though knots are rejected, the ability to use short lengths makes it possible to work very closely.

Furniture Man's Appointment

IN our last issue it was announced that Mr. Frank Lovett, of the Canada Furniture Manufacturers, Limited, Woodstock, Ont., had received the appointment of Inspector for the Furniture Manufacturers' Safety Association, his duties to extend all over Ontario. An introduction to Mr. Lovett through the medium of these columns will doubtless be of interest to many of our readers. Mr. Lovett was born at Galt, Ont., where he learned the trade of a machinist with the MacGregor Gourlay Company, manufacturers of woodworking machinery. In 1896 he entered the employ of the London Furniture Company. Two years later he made connections with the Anderson Furniture

Frank Lovett.

Company, of Woodstock, now the Canada Furniture Manufacturers, Limited, with whom he remained until he obtained his appointment of Inspector. At both London and Woodstock Mr. Lovett had charge of the repair department, looking after the machinery, and providing suitable safeguards for it. At the plant of the Canada Furniture Manufacturers, Limited, he also had charge of first aid work. It is of interest to note that Mr. Lovett has the ability to teach others as well as himself, than which there could be no better tribute to his mastery of trade details. He has been one of the instructors at the Evening Classes of the Woodstock Industrial School, having had charge of machine shop practice and other work, for which he received great credit from Dr. Merchant, the Government Inspector.

Setting Up and Operating the Molder

THE molder is generally the most abused machine in a woodworking establishment, says a writer in The Woodworker, of Indianapolis. I have worked in factories where there were twelve to fifteen moldermen employed, and what a conglomeration there was. Some were good and some were very bad, in the mechanical line. Some of them banged things right and left, using wrenches for hammers to drive a nail, shift a chipbreaker or guide, etc. When told not to do that, as hammers were built for that purpose, they would say, "I should worry; they're not mine." They would break and batter up wrenches so that you would not recognize them from a twisted piece of scrap-iron. For driving a nail, or other work around a molder, use a hammer; have one handy, so that you can put your hand on it.

A tool box made of ¾-in. stock, 15 in. long, 10 in. wide, and 8 in. deep, with bottom of screen wire with 1-in. mesh, will be found very handy for holding tools, wrenches, etc. If not convenient to use screen wire, take a board ½ in. thick and see what you are getting. I have seen men lay wrenches and tools on a bench or table near machines they were operating, where they would get covered up with shavings, short pieces of molding, and other refuse. Then, when a tool was wanted, they would have to scatter the shavings all around before finding what they wanted.

When starting a molder, see that all the heads are running before doing anything else. There are lots of men who start the machine up without doing this. They will start a piece through the machine and not notice anything wrong until they smell burnt leather; then they will get busy. They look around the machine, see if anything is rubbing on the belt, or other things, usually looking everywhere but in the right place. The result is that the belt is burned stiff, the oil is about all out of it, and it is necessary to get a new one. One cannot be too careful about this matter. Sometimes dirt sifts through into the box, gets hot and forms a crust, and naturally works against and cramps the arbor.

If the belt is slack and will not start readily, tap it with a little weight when starting. If that does not do it, perhaps the boxes need adjusting. If so, loosen the capscrews a trifle; if that does not loosen it up, pour on a little kerosene; sometimes this will wash all the dirt out of the boxes. In some cases the fault is in the boxes, the babbitt being all burned in flakes. If that is the case, knock out the babbit and pour a new box, using a good grade of medium hard metal. Clean all the dirt out of anchor holes and box. If you have a blow torch, apply heat on arbor and box until it begins to sweat. This gets all the dampness out and takes the chill off the metal.

Next cut small pieces of leather, to hold the arbor in place while babbitting. Use a piece ½ in. square, the thickness of babbitt that is needed under the arbor; or a piece ¼ in. wide, half-way around box under the arbor, same thickness as babbitt is to be. Then cut pasteboard liners, and between the liners and the pieces of leather, get the shaft in centre of box. It looks nicer, wears better, equalizes the babbitt, and makes a strong box. When this is done take the cap off again, place liners to one side, and do not get them mixed. Paint the shaft with white lead, a nice smooth coat, and place over leather, then comes the liners, and then the cap. Tighten the bolts about medium. Get babbitt melted, not too hot; get it to a running point only. Put in a little piece of rosin the size of a hazel nut; this will harden it and make the metal run smoother, and also will burn all the dirt and dross out. Skim the metal, then pour it.

I use white lead because it insulates the steel and the arbor will not spring. Some use an extra arbor for that purpose, but to my notion this is poor practice, as the arbor wears more than the substitute and it gets out of size, making necessary a lot of scraping. Lead will always form itself according to the shaft, and very little scraping will be needed.

Keep the machine clean at all times, also the floor around it. This is pleasing to the eye and sets a good example. Don't throw rubbish around the machines; it makes walking dangerous. I have seen men allow sticks and shavings to pile up around their machine so that you could not come near it without a pair of stilts. Keep the shavings clean under the heads also, and don't let them pile up to the belts; if the boxes get hot and belt slips, you will wonder why. See that all guides and clipbreakers are adjusted properly, so that when starting a board through it will not come in contact with them and cause a wreck and expensive repairing. Broken parts are never the same unless they are blazed or welded, but if a good job of welding is done the casting will be as good as new.

Always be careful of yourself and the machine. Keep your mind on the work at all times, and endeavour to turn out work of which you won't be ashamed. A new man should never try to do too much work; he gets excited when all eyes are on him. In many cases the machine needs adjusting and repairs, but many owners never think of these things, and will not spend time and money to keep them in repair; but they wonder why good and fast work cannot be done —and the new man is always the "goat."

All lost motion should be kept out of the boxes, because in time it cracks and pounds the babbitt loose, and the result is poor work. Do not adjust the pressurebar too tight, or it will lead the lumber away from the guide. I have often wondered why all machine manufacturers do not put in some provision for adjusting the rollers or guide on an outside machine; some have it, and some do not. Many machines have a lot of springs which are of little use. Some operators adjust the rollers by raising them a little higher

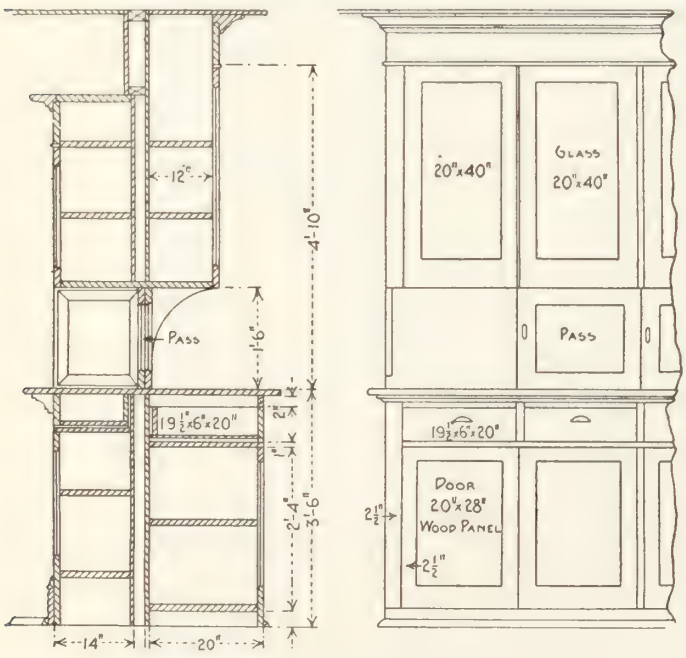
in towards the guide, but that does not work satisfactorily.

Be careful of the knives; see that they are all balanced perfectly at all times. Use a good knife balancing scale; do not use some hand-made affair that is not accurate. In a shop I visited recently the operator used a board about ½ x 3 x 24 in. with a nail driven in the centre. He put the knives on the ends, and if they went up and down he thought they were all right. The result was that he was babbitting twice a year, and had his arbor in the machine shop half the time.

Molding knives should always be kept in a rack built for that purpose. There are lots of makes to build to, but make one in which you see the cutting edge at all times, and can get the knife you want without wasting time in looking for it. Place all covers, ogees, beads and other patterns in separate racks, then when needed it will not be necessary to take them out to see what they are. When you have finished using knives, grind them and put them back in their proper place. When using numbers from the molding book or catalogues, stamp numbers on knives, or on the rack where they are kept, and you will not change them for some other pattern by mistake. Oil the bolts often; it preserves the threads.

Built-in Buffets

ONE of the conveniences of the home which has received no little attention in recent years is the built-in buffet. The designs may be varied to an unlimited extent, being governed almost wholly by the purse of the owner and the surroundings in which they are placed. When properly constructed such fixtures produce most pleasing effects



Sections and partial elevation of a built-in buffet and Dutch kitchen.

and constitute an important adjunct of the dining-room equipment. Even a low cost house may have a built-in buffet of attractive design for less than the cost of a piece of furniture that would answer the same purpose.

The accompanying illustrations are offered as a suggestion. The sizes of doors, panels, drawers, etc., are clearly indicated, or can be taken off with a rule, as the drawings are presented to scale. The designs are all drawn to conform to a 7 ft. door but may be modified without altering the general elevations.

To simplify construction it is good practice to trim these fixtures to correspond with that used on doors and windows and to run the base in the same manner. It has the effect of making the buffet appear as a part of the house itself, which in fact it is.

It is recommended that as much of the work as possible be done at the bench. It is in fact possible to do it all there if due care be exercised and the buffet can then be set in place and secured in position with a few screws driven through the side panels from the inside into the studding. Should this be attempted care must be taken to place proper grounds for the plaster and also to see that the opening is true to size and plumb on the sides.

Occasionally it is possible owing to the position in the wall to build the buffet so that the face or front of it is flush with the wall line. The side panels are then eliminated and the sides may be plastered in the same manner as the back and as indicated in the details. It is difficult to design a buffet of the nature here shown without having the plans of the room in which it is to be placed, but the sketches presented will doubtless be found of suggestive value.

In the front elevation of the lower design on the opposite page, the upper doors are of art glass measuring 20 x 22 in. each, while the lower doors consist of wood panels 20 x 24 in. The drawers are 19½ x 6 x 19 in. The bevelled plate mirror at the back of the countershaft is 68 in. long by 15 in. high. The sides of the buffet are built to match the front, as indicated in the end elevation.

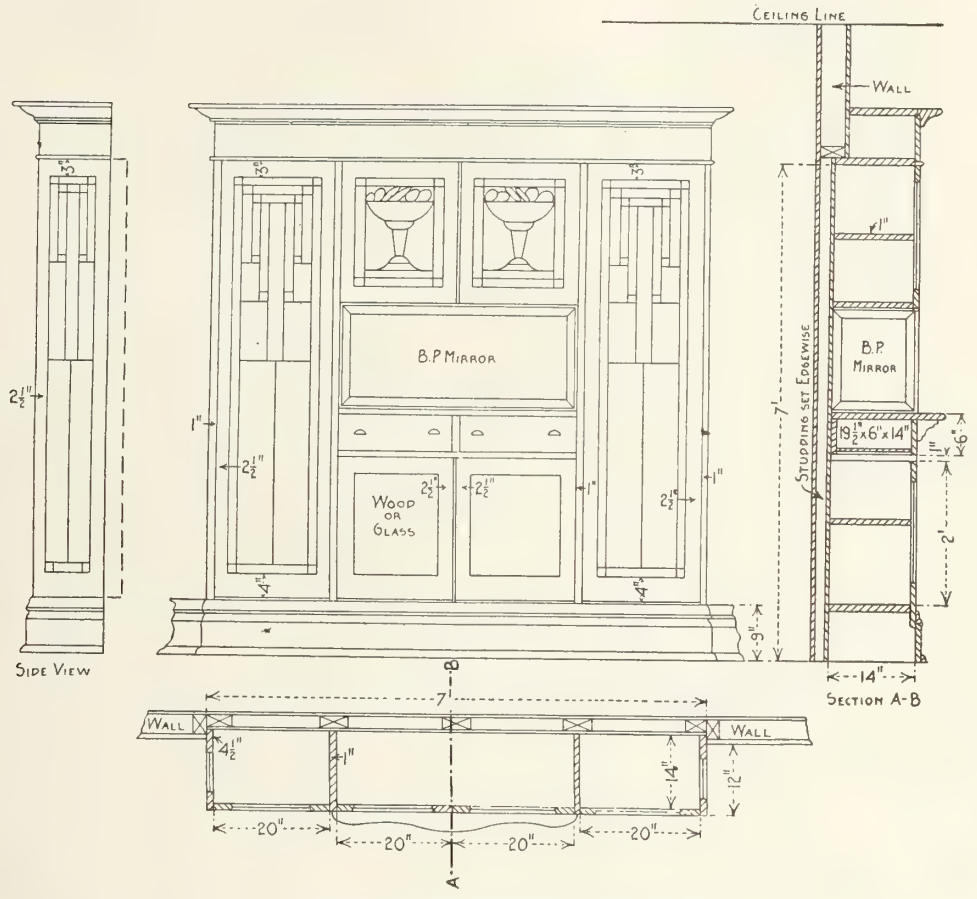
Special Market for Cooperage

Large quantities of cooperage are manufactured annually at Almeria in Spain for the shipment of grapes. Grape barrels are chiefly made of oak and pine—probably more pine is now used than oak. Apart from a few shipments of oak staves from Liverpool brought there from the United States the remainder is imported direct from New Orleans.

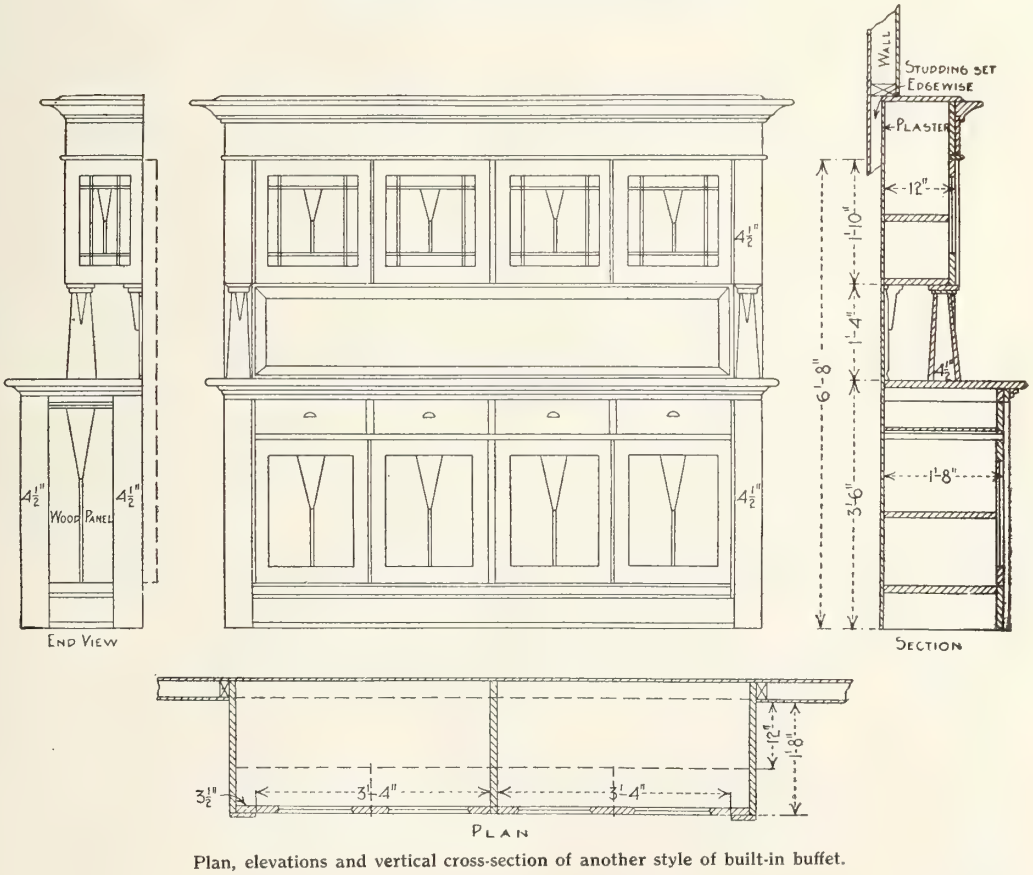
The dimensions of the pine staves are as follows, viz.: Length, 0.49 to 0.50 centimetres; width, 5.50 to 6 centimetres; thickness, 6 to 7 millimetres. The number of pieces to a barrel are 28 to 30. Ends, 0.42 x 0.42 centimetres—three pieces, although a proportion of four pieces is admitted— thickness, 10 to 11 millimetres. The prices of this timber range from 0.6 to 0.85 cents of a pesta ex store for the quantity necessary for each barrel. The hoops for these barrels come chiefly from the north of Spain, and from the Barcelona district. Occasionally cargoes are imported from Italy.

It is easy enough to point out certain things which characterize the difference between cut and sawed veneer, but after it is put into work and carefully finished off it is a puzzling job for even the experts to distinguish the difference, provided of course the job has been well done.

It is perfectly right that lots of thought and attention should be centred upon the matter of glue, its selection and use in veneering, because glue is in many respects the most important item in the veneer industry.



Elevations, plan and section of a built-in buffet.



Plan, elevations and vertical cross-section of another style of built-in buffet.

Uniform Basis for Figuring Feetage of Boxes and Shooks

ON this subject of figuring feetage it is conceded that for results and intelligent comparisons, the actual net measurement is the only basis that can be used that will work satisfactorily for everyone.

The following has therefore been adopted:

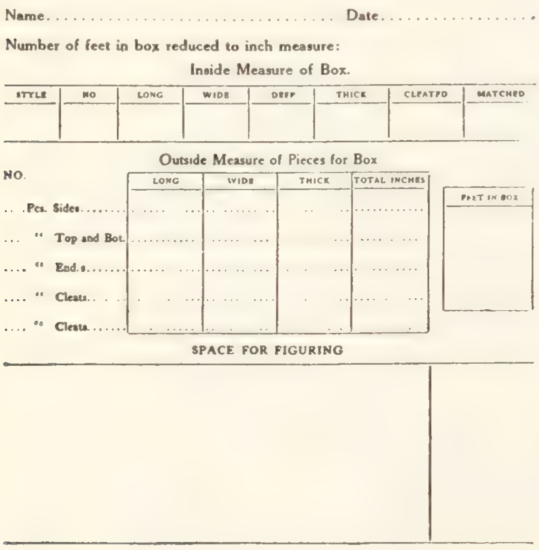
First: That the association have prepared and published for distribution amongst the members an accurate estimator book using the methods of figuring adopted at this meeting.

Second: A scale of additions to cover the extension or over-lapping of different parts of a box, including the cleats. This scale should be used uniformly all through the process of figuring.

Third: The following schedule to cover the additions for every extension, these additions depending on the lumber used:

For two extensions over any 1/4 in. thickness, add ½ in.
For two extensions over any 5/16 in. thickness, add ¾ in.
For two extensions over any 3/8 in. thickness, add ¾ in.
For two extensions over any 7/16 in. thickness, add 1 in.
For two extensions over any 1/2 in. thickness, add 1 in.
For two extensions over any 9/16 in. thickness, add 1¼ in.
For two extensions over any 5/8 in. thickness, add 1¼ in.
For two extensions over any 11/16 in. thickness, add 1½ in.
For two extensions over any 13/16 in. thickness, add 1¾ in.
For two extensions over any 7/8 in. thickness, add 1¾ in.

Fourth: Lay out your boxes into so many definite parts. The use of a diagram as shown with which to make your layout is suggested:



Fifth: Figure all boxes net and on the actual inside measure. Example: a box 11½ in. wide, inside measure, with sides of ⅜ in. thickness, figure the top 12¼ in. wide.

Sixth: Figure only on the ¼ in. fractions. Example: a box 5⅝ in. deep, figure sides as 5¾ in. wide. In other words, change dimensions ending in 1/16 or ⅛ to the next ¼ fraction.

Seventh: In making out your lay-out, remember the following:

(1) Add to the width of the top and bottom for the extension over sides. Example: box, inside measure, 11½ in. wide, sides ⅜ in. Figure top 12¼ in. wide.

(2) Add to the length of sides, top and bottom, for the extension in length over ends, as in Style No. 1. Example: a box, inside length 19⅝ in., with ends 13/16 in. thick. Add 1¾ in. for ends. Figure length of top or bottom as 21½ in. long (not 21⅜ in.).

(3) Add to the length of sides for extension over ends and cleats as in Style No. 4. Example: inside length 19⅝ in.; ends 13/16 in.; cleats ⅜ in. Add 1¾ in. for ends; add ¾ in. for cleats. This gives you 22⅛ in. Figure length of sides 22¼ in. Top and bottom 21½ in.

(4) Add to the length of sides, tops and bottoms for extension in length over cleats and ends, as in Styles Nos. 2, 2½ and 3. Example: inside length, 24⅝ in.; ends, ½ in. full; cleats, ⅝ in. Add 1 in. for ends; add 1¼ in. for cleats. This gives you 26⅞ in. Figure length of sides, top and bottom 27 in.

Eighth: To figure uniformly the thickness of sawn lumber, the following method should be used in order to arrive at a basis for securing uniform feetage:

Box parts made from—

	3/16 rough	... ...	figure 3 pieces from 4/4
	3/16 D1S	... ...	figure 3 pieces from 4/4
	1/4 rough	... ...	figure 3 pieces from 4/4
*	1/4 D1S	... ...	figure 3 pieces from 4/4
	5/16 rough	... ...	figure 3 pieces from 5/4
*	5/16 D1S	... ...	figure 3 pieces from 5/4
	3/8 rough	... ...	figure 2 pieces from 4/4
	3/8 D1S	... ...	figure 2 pieces from 4/4
	7/16 rough	... ...	figure 2 pieces from 4/4
*	7/16 D1S	... ...	figure 2 pieces from 4/4
	1/2 rough	... ...	figure 2 pieces from 5/4
	1/2 D1S	... ...	figure 2 pieces from 5/4
	9/16 rough	... ...	figure 2 pieces from 5/4
*	9/16 D1S	... ...	figure 2 pieces from 5/4
	5/8 rough	... ...	figure 2 pieces from 6/4
	5/8 D1S	... ...	figure 2 pieces from 6/4
	11/16 rough	... ...	figure 2 pieces from 6/4
	11/16 D1S	... ...	figure 2 pieces from 7/4
	3/4 rough	... ...	figure 2 pieces from 7/4
	3/4 D1S	... ...	figure 2 pieces from 7/4
	13/16 rough	... ...	figure 1 piece from 4/4
	13/16 D1S	... ...	figure 1 piece from 4/4
	13/16 D2S	... ...	figure 1 piece from 4/4
	7/8 rough	... ...	figure 1 piece from 4/4
	7/8 D1S	... ...	figure 1 piece from 4/4
	7/8 D2S	... ...	figure 1 piece from 4/4
	15/16 rough	... ...	figure 1 piece from 4/4
	15/16 D1S	... ...	figure 1 piece from 4/4
	4/4 rough	... ...	figure 1 piece from 4/4
	4/4 D1S	... ...	figure 1 piece from 5/4

*These are commercial or merchantable thicknesses with a reasonable variation permitted.

A.—If full thickness without variation is required, then use greater thickness for your basis of figuring.

B.—If shook stock is to be dressed two sides and full thickness also, use next thickness of lumber except where specified in above list.

C.—Veneers and rotary cut lumber to be figured surface measure. A box constructed of a combination of lumber and veneer, each product should be figured as referred to above.

Ninth: Crates and crating.

(1) Figure only on the ¼ fractions.

(2) For crating required full width, add ¼ in. to the actual width (figuring on ¼ in. only).

Example: (a) Crating strips, 1¾ in. full, figure as 2 in. wide.

(b) Crating strips, full 1⅞ in. or 1 15/16 in. figure as 2¼ in. wide.

(3) Crating in fractional lengths figure length on the next ¼ in. as in shooks.

Tenth: Lock corner and dovetailed boxes.

Figure same as regular shooks:

(a) Use the next thickness of lumber shown in above table for your basis if stock is D2S.

(b) Add ¼ in. to length of ends and sides on account of extra projection of the tenons for lock corner or dovetailed boxes sold in the shook.

Better Nailing of Boxes

THE National Association of Box Manufacturers, in their campaign for increasing the use of wooden boxes and meeting the competition of fibre boxes and other cheap and unsatisfactory varieties of containers, recently issued a pamphlet on the subject, which reads in part as follows:

"It is imperative that the shook manufacturers, shook consumers and the railroads require that wooden boxes do the work for which they are designed, viz., carry safely to destination without breakage. We, therefore, ask the co-operation of all interested, in the better nailing of wooden boxes, and herewith submit a schedule of general rules, giving the size and number of nails to be used for the different thicknesses of lumber.

"The number of nails to be used for a given box is determined by adhering to the rule of spacing nails approximately two inches apart, except when nailing up boxes where sides, tops and bottoms consist of more than one piece. In such case make sure the narrow pieces have at least two nails in each nailing edge, and more if necessary to comply with the rule for two-inch spacing referred to.

"Schedule for the nailing of soft wood boxes: ¼-inch thick, use 4d cement coated nails; ⅜-inch thick, use 5d cement coated nails; 7/16-inch or ½-inch thick, use 6d cement coated nails; 9/16-inch or ⅝-inch thick, use 7d cement coated nails; ⅞-in. thick, use 8d cement coated nails.

"Schedule for the nailing of hard wood boxes: ¼-inch thick, use special large 3d or regular 4d cement coated nails; ⅜-inch thick, use 4d cement coated nails; 7/16-inch or ½-inch thick, use 5d cement coated nails; 9/16-inch or ⅝-inch thick, use 6d cement coated nails; ⅞-inch thick, use 7d cement coated nails.

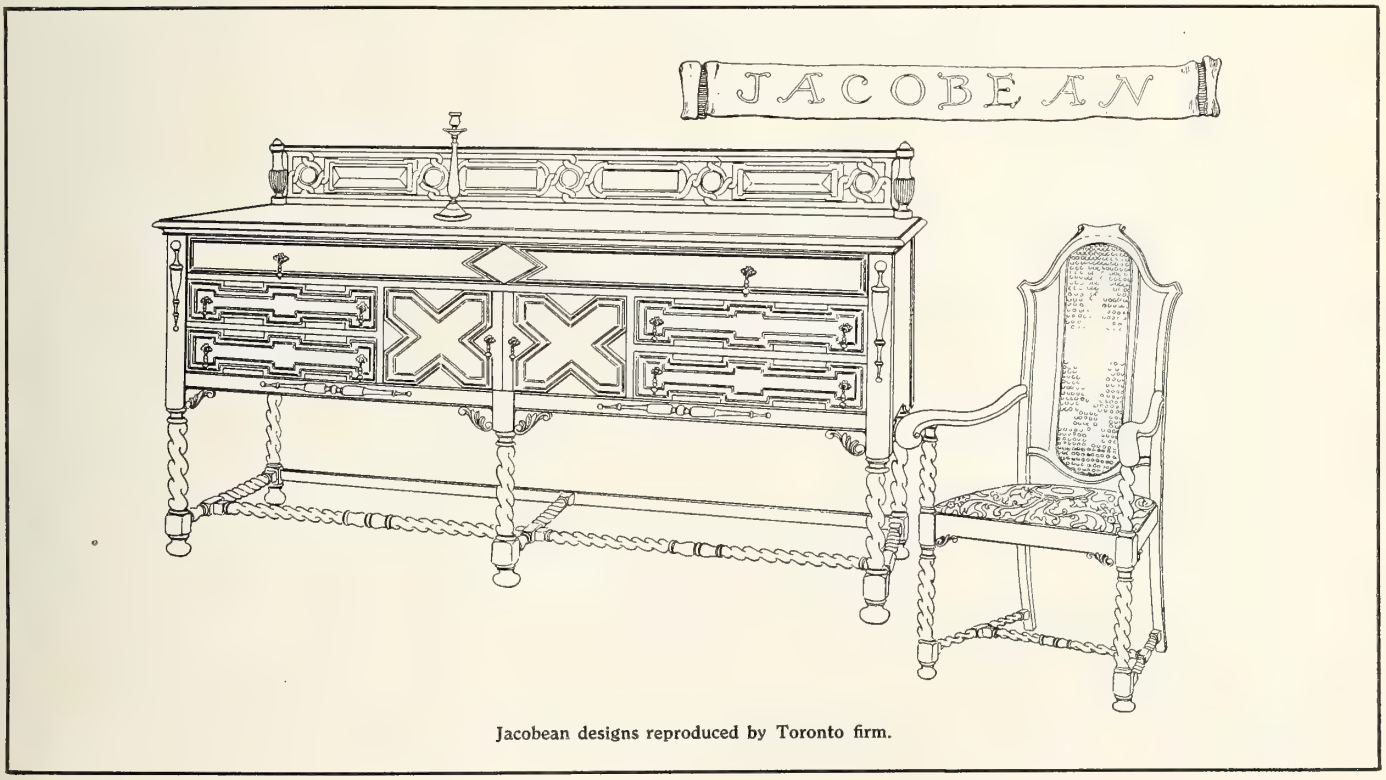
Two illustrations are given in the pamphlet, one showing the wrong way and stating as the items of inefficiency: Not enough nails; nails driven in straight line, all in end grain; nails driven in cracks, and no side nails. The right way shows: One-third more nails; nails properly staggered and tipped; nails all driven into stock, and side nailed. Commenting on these illustrations, the association says:

"If the above suggestions are strictly adhered to, it will add greatly to the carrying strength of wooden boxes. We are sending this pamphlet to shook consumers and ask their co-operation for the better making of packages. Won't you please co-operate with us to the extent of instructing your nailers to make sure that your boxes are nailed the right way.

The National Canners' Association reports that by direction of the executive committee, application has been made to the official classification committee of the Eastern railroad territory for permission to ship open boxes of canned foods, with the lids tied in bundles instead of nailed on.

Jacobean Furniture in Toronto

ILLUSTRATED below is a Jacobean sideboard and chair, designed and constructed in oak by The Toronto Furniture Company, Limited, of Dufferin Street, Toronto. The workmanship to be found in the well-balanced and carefully designed mouldings and twisted work in the two pieces shown will be noted with interest. The sideboard and chair pictured are exact reproductions of those which formed part of the Jacobean suite exhibited this year by The Toronto Furniture Company at the Canadian National Exhibition. A reference to their exhibit will be found on another page.



Jacobean designs reproduced by Toronto firm.

Woodworking Exhibits at the Canadian National Exhibition

THE Thirty-Seventh Annual Exhibition of the Canadian National Exhibition Association was remarkable in many ways, but in none more so than in the manner in which it demonstrated the clear conviction of a large section of the general public, as well as of the manufacturing interests of the country, that there is something in the "business-as-usual" sentiment after all. It was a monument to the enterprise and faith of those who believe that Canada has not only a great destiny to fulfil **after** the war, but much useful work to achieve **during** the war.

The records of attendance alone, which easily eclipsed those of last year, are material and striking proof of the support which the country gives to an institution which is coming to be regarded as the greatest annual Fair in the world.

In making the round of the exhibits The Canadian Woodworker was cheered by many optimistic reports. No extravagant statements were forthcoming, but sufficent was said to indicate that on the whole the inquiries received were satisfactory and even gratifying. Nothing more could be expected, having in mind the reduced volume of business transacted of late.

One might describe the scope of Toronto's great Fair as all-embracing, for it is possible to see almost anything—either made or in the making—from the proverbial needle to the proverbial elephant. But with all the variety of manufactured lines, none attracted greater attention than the woodworking exhibits.

The number of exhibitors this year was about the same as last. There was the same rush for "space" right up to the very last moment, and in many cases the applications had to be refused. A few old faces were missing, but many new ones were to be seen—this in itself bearing striking witness to the assertion that there is always someone in waiting for opportunity, and that competition and business will not stand still because a few drop out of the race.

We give below brief reports, arranged alphabetically, upon some of the exhibits noticed in the course of our round. Manufacturers are invited to send us photographs of special interest where such are available.

Batts, Limited, West Toronto.—A well laid out display of veneered and pine doors, staved columns, interior fittings, etc., formed the principal features of this firm's exhibit. The company specialize in interior construction generally, covering newels, balusters, sash and frames, mouldings, "Beaver Brand" flooring, stairs, panelling, etc., and their excellently arranged exhibition displayed the best of these lines to good advantage. This company also had a booth outside the Process Building, where a variety of staved columns and other interesting samples of the firm's manufacture were displayed.

Berry Brothers, Inc., Toronto.—The principal features of this firm's exhibit were their various lines of Luxbury wood varnish, comprising spar, elastic outside and interior finish, and Shingletint, Dulgloss and Lacklustre finishes. Various samples of woods finished with Luxbury varnish were exhibited. Liquid Granite, another product of this company's make, is also used for various kinds of interior besides floor work, it being of special use for counters, bath rooms, wainscoting, stairways, balustrades, baseboards, inside doors, etc., and forming an adaptable varnish for woodworking purposes.

Canadian Machinery Corporation, Limited, Galt, Ont.—Among this company's collection of woodworking machinery on exhibition in the Machinery Hall were the following: a 48-in. re-saw, double-post type, chain mortiser, upright hollow chisel mortiser, relisher and a new type of variety saw, a 32-in. automatic knife grinder, and a model of the company's new 504 tenoner. Mr. D. King was in charge of the exhibit, together with Messrs. P. V. Burton, W. J. Irving and M. Preston.

Conboy Carriage Company, Limited, Toronto.—Displayed several lines of their wagon and automobile bodies. This company have an extensive output of buggies, carriages, jitney and bus bodies, tradesmen's wagons of all descriptions, in addition to their line of automobile bodies and fixtures. One of their features this year was an exhibition of the "One-man" top, a waterproof cloth affixed to a patented appliance which allows of adjustment by one man, and when fully extended forms a complete top to the automobile.

Cooke & Boulton, Toronto.—Exhibited various samples of their C & B floor wax, which the company claim is an unexcelled medium for all kinds of woodwork and floors, giving a hard and quick-drying finish. C & B floor wax has been used in several important government buildings, hospitals, and business buildings in Toronto.

Cowan & Company, of Galt, Limited, Galt, Ont.—During the last few months it has been the good fortune of Messrs. Cowan & Company to secure large and increasing business arising out of war orders. At the present time there is a great demand for woodworking machinery such as the Cowan Company manufacture by factories engaged in the turning out of shell boxes for the Government. Owing to this the company were able to exhibit only a small amount of machinery, their booth containing but four or five machines, the company having been unable to obtain any more spare machines from the factory. The exhibit consisted chiefly of a power feed rip-saw, two chain saw mortisers and a 6-in. molder. Mr. Cowan and Mr. Barrons were in charge of the stand.

R. O. Cumback, Toronto and Brantford, Ont.—Manufacturers of the "Brantford" automobile and motor trucks of all descriptions, a few models of which were on exhibition. The company manufacture a special line of Brantford trailers for hauling purposes. One of these formed part of the exhibit. These trailers can be attached to a car and are built in various sizes for all uses. Lorries for baggage transfer, etc., express wagon bodies, special bodies for basket fruit conveying, are all part of a large output.

Doherty Piano Company, Limited, Clinton, Ont.—This firm had a tasteful display of their various lines of pianos and organs, one or two of which deserve special mention. A Circassian walnut piano in Louis XV. style, a piano in Colonial style, finished in silver oak, an Otto-Higel action player piano in finished mahogany, and a two-manual church organ in highly polished oak case, all attracted attention. Mr. W. A. Moreland had charge of the exhibit.

Dupont Fabrikoid Company, Toronto.—This firm had two exhibitions, one in the Process and the other in the Transportation Halls. In both exhibits samples of their

Synthetic, Craftsman and Muralot leather were to be seen, covering different shades and grades for furniture upholstering, wall decoration, carriage tops, motor hoods, etc.

Robert Elder Carriage Works, Limited, Toronto.—Mr. Robert Elder, in charge of this exhibit, informed us that for the last twelve months he had been specializing in a new departure of carriage construction—automobile bodies, for which there is a great demand. An example of this particular class of goods formed the feature of the Elder exhibit. Other exhibits comprised models of the Elder Works' delivery and other wagons, lorries, etc.

Elliot Woodworker, Limited, Toronto,—Had a fine exhibit of their well-known machines, including the No. 3 machine with tilted table and graduated dial, specially adapted for cutting side ends at any angle. The Elliot No. 2 without the graduated dial was also shown. Of this latter variety Mr. W. A. Elliot, who was in charge of the exhibit, informed us that the company had sold over six hundred. Other machines on exhibit includes a scroll saw, a shaper, and a wood drilling machine for cutting single or four holes.

Globe-Wernicke Company, Limited, Stratford, Ont.—Two compartments of this company's booth, in the Manufacturers' Building, served to display their line of office and library equipment. In the "office" were to be found examples of roll top desks, in oak, chairs and filing cabinets, disappearing typewriter desks, office tables, flat top desks, and office book-cases. A feature of this exhibit was a steel safe—fireproof, and equipped with Yale combination lock, the interior being fitted up for the filing of deeds and important correspondence, with a special system of card index and folders complete. In the library were to be found various samples of solid mahogany book-cases and desk and bureau units of modern design, together with a full line of library equipment.

Gold Medal Furniture Manufacturing Company, Limited, Toronto.—Hercules spring beds, bed davenports, upholstered mahogany and oak chesterfields, sofas and davenports, were on exhibition at this company's booth. The upholstering and workmanship generally called forth special praise.

G. Walter Green Company, Limited, Peterborough, Ont. Had a comprehensive display of woodworking machinery, consisting of double edgers, jointers, matching shingle machines, lath bolders, for manufacturing laths out of round material, and other types. This company have an extensive output of all kinds of single and double geared and friction log jacks, lumber trimmers, saw and lath mills, and other machinery. Mr. T. O. Donaldson was in charge of the exhibit.

Hutchinson Woodworker & Contracting Company, Limited, Toronto.—This company's various woodworking machines included 6-in. jointers and their combination woodworkers, No. 1 adapted for rip or crosscuts on 4-in. lumber, and No. 2 taking 6-inch. These machines are fitted with individual motor drive and will work at any angle. The Hutchinson portable combination woodworker is claimed by the company to be an indispensable machine for carpenters, contractors, pattern-makers, cabinet-makers, millwrights and all classes of woodworkers. It will cut studs, rafters, braces, boring for dowelling, tenoning, dadoing, window sills and door jambs, moulding and mitring of all kinds. The exhibit proved one of special appeal to the woodworking manufacturer.

Jackson Wagon Company, Limited, St. George, Ont.—Farm and team wagons, together with Sloop and Ontario sleighs, are a specialty of this company's manufacture. Models of their "Handy" wagons were displayed in the Grounds section of the Exhibition. Some of the points of advantage which the company claim for their wagons are the riveted wheel, 1¼-in. box bottom, clipped bolster plates, sand-proof arm, safety pole cap, clipped gear and riveted box cleats. The Jackson Company manufacture every part of the wagon at their factory at St. George, the vehicles being turned out ready for immediate use. The wood chiefly used for the bodies is oak, and for the axes, maple and hickory.

Karn-Morris Piano & Organ Company, Limited, Woodstock, Ont.—Had on exhibition fifteen pianos, showing the various designs of their manufacture in this line of goods, featuring walnut, circassian walnut and mahogany-cased instruments. Five player pianos of the Karn and Morris type were shown. An attraction was a Karn fumed-oak cottage piano in Mission design. Mr. D. S. Cluff, the company's Western sales manager, was in charge.

Kilgour Davenport Company, Toronto.—Featured their Simplicity Davenports and Chesterfields, arm chairs, etc. Various samples of the company's manufacture were shown in mahogany, fumed and golden oak. The arrangement of the exhibit generally made an advantageous display.

R. Laidlaw Company, Limited, Toronto.—Had a fine exhibit of interior and exterior woodwork. A handsome colonnade, which stood at one end of the company's booth, consisting of a mahogany front door, with fluted columns, pilasters, white enamel sidelights, etc., formed an excellent example of the company's work. On the door were the figures 1871, this being the date of the company's first establishment. At the rear of the booth was a sample of interior panelling and door work, of bungalow design, and of quarter-cut oak, a line of manufacture for which the company have a great demand. Other exhibits were slab veneered and various patterns of doors of all kinds, birch, maple, and white and red oak hardwood flooring, etc. On a revolving pedestal were displayed fifty samples of the most commonly known woods, showing the variety of the company's output.

W. S. Mahaffy Company, Toronto.—Had on exhibition in the Manufacturers' Annex a variety of their transporting, warehouse, and factory trucks. One of this company's features is their truck specially built for tilting, the centre wheels being higher than the end wheels, and the truck having loose posts. The end wheels of this truck travel on a steel axle, giving it the advantage of being able to turn corners easily. Mr. F. G. Mahaffy was in charge of the company's exhibit.

Martin-Orme Piano Company, Limited, Ottawa, Ont.—A varied assortment of designs, of special interest to the woodworker, were to be seen at this firm's booth in the Manu facturers' Building. The lines shown consisted of Mexican and African mahogany and American walnut and oak pianos. The company handle various lines of players, in mahogany and walnut, as well as a variety in fumed and Mission oak. Mr. O. Martin, President of the company, was in charge of the booth.

Mason & Risch, Limited, Toronto.—A mahogany grand piano, fitted with a metal action player, was the chief attraction of this firm's exhibit. Another feature was an inlaid walnut upright. Upright players were demonstrated in the rear compartment of the booth.

Mendelssohn Piano Company, Toronto.—A well-selected collection of this firm's satin-finished mahogany pianos, of a new style, made an attractive exhibit. Cottage Mission oak and walnut pianos were also featured. Mr. Harry Durke, President of the company, was in charge.

Benjamin Moore & Company, Limited, Toronto.—Various samples of this firm's "Sani-Flat" and "Muresco" paints and tints for interior and general decorating work were on

exhibition in a tastefully laid out booth in the Manufacturers' Annex. In using Sani-Flat, the company claim that all woodwork or old walls that have been painted before require no preparation, one or two coats of Sani-Flat being sufficient, except for calcined walls. Sani-Flat is a washable preparation, Muresco White and Tints being of calcimine. Both preparations cover a wide field of colors and can be used for almost every purpose in finishing and decorative work. Mr. E. C. Roberts had charge of the company's exhibit.

Mozart Piano, Limited, Toronto.—A piano in the style of Louis XV., having a case of old mahogany with satin finish, formed a feature of this firm's exhibit. Another instrument of almost equal interest was of Jacobean design, particularly suitable for drawing-room and music room. Mr. M. Cohen, President of the firm, and Mr. Cecil Sinkin were in charge.

McFarlane Ladder Works, Toronto.—This company had a comprehensive exhibit of their various lines of manufacture, comprising all kinds of ladders for the use of builders, painters, electricians, window cleaners, etc., in the construction of which the firm are chiefly specifying yellow and clear hard Norway pine, rock elm being mostly used for the rungs. Other exhibits were trestles, swing stages, clothes-horses, extension planks, wash-boards, verandah furniture, chairs, tables, etc., folding lawn chairs, bake boards, and ironing boards.

Nordheimer Piano and Music Company, Limited, Toronto.—A well-matched piece of crotch mahogany, finished in the white, without any application of stain or varnish, formed the case of a piano prominently displayed at this company's stand. The design of this piano was unique, the idea of finishing in white or natural wood being something original. Pianos of satin mahogany, art design, mahogany grands, and special lines of Nordheimer players were other features of the exhibit. An electric player of white finish mahogany and another of fumed oak, together with a satin finish bual mahogany piano, were also shown.

Office Specialty Manufacturing Company, Limited, Toronto.—A feature of this company's exhibit was their display of imitation mahogany and oak steel filing cabinets and lockers. These articles are finished in a manner causing them to resemble highly polished mahogany and oak, and they combine the strength and durability of steel with the handsome appearance of a wood finish. Other exhibits comprised the company's well-known line of office furniture, typewriting, flat-top and roll-top desks, filing cabinets and drawers, card index cabinets, book-cases, library fittings, and bankers' grille work, book trucks, etc.

Pratt & Lambert, Inc., Bridgeburg, Ont.—The exhibit of this firm included a demonstration of their well-known "Vitralite," particularly adapted for interiors of theatres, libraries, hotels, etc. A sample of the company's "61" varnish, suitable for all purposes, and of their "38" varnish, were displayed—the latter on a piece of California red wood, showing the excellent appearance and effect of this grade of varnish. Tests were shown proving the waterproof qualities of the company's white enamel varnishes for outdoor and interior work. The raw materials, pure gums, etc., were an addition to an interesting exhibit.

Preston Woodworking Machinery Company, Limited, Preston, Ont.—This company had an excellent exhibit of their various makes of woodworking machinery, including a 36-in. band-saw, 12-in. moulder, power feed rip-saw, and a high-speed ball-bearing shaper. Buzz planers, moulders, boring machines, patented belt sanders, steam retorts, furniture clamps, wood lathes, tenoners, mortisers, power door clamps, veneer taping and hockey stick machinery are a few of the various manufactures. Mr. E. M. Kerr was the representative in charge of the company's exhibit.

Ramsay & Son Company, Montreal.—A tastefully laid-out booth exhibiting superior lines of paints. Five or six compartments at the rear of the booth were used to demonstrate the color effects attainable with this company's line of tints, comprising mahogany furniture stain, Dulton white, white enamel, light oak, and other artistic shades. Ramsay's paints are used extensively for both interior and exterior work, and form an excellent decorative medium and finish for both.

"Ronuk" Limited, Toronto.—Samples of linoleum and cork matting demonstrated the uses of this firm's line of floor wax. "Ronuk" floor wax is put up in both liquid and paste, and is suitable for all manner of woodwork finishing. The polish is supplied in various sized tins together with a broom-shaped polisher to eliminate kneeling and facilitate polishing. Above the company's booth the Royal coat of arms was displayed in gold, announcing their appointment as manufacturers to the Royal Household.

Seamen, Kent Company, Limited, Toronto.—This firm had an exhibit featuring their Beaver Brand floor finish, two samples being shown, demonstrating the use of the Beaver Brand on quarter-cut oak and plain red oak. The company's booth, in a corner of the Process Building, formed an interesting exhibit.

Sturgeons, Limited, Toronto.—Kyanize floor finish, for all purposes, including furniture and interior woodwork, was specially featured at this company's booth in the Process Building. The various colors of this preparation cover light and dark oak, cherry, walnut, mahogany, golden oak, rosewood, colonial green, and ground color. "Solignum" (a wood preservative and color stain), Paripan enamel for all purposes, Solpar wood fillers, stains, wax, Charlton white, and Ferrodor metal protective paint, were also included among the exhibits at this firm's booth.

Toronto Furniture Company, Limited, Toronto.—Two fine suites of this company's manufacture were on exhibition in the Manufacturers' Hall. They consisted of a Jacobean period design dining suite of oak, and an Adam period bedroom suite of mahogany antique finish. The sideboards, dining-tables, chairs, and bedroom furniture were all of excellent workmanship. The company are responsible for all their own designs. The representative in charge of the exhibit, himself one of the designing staff, spoke of the suites on exhibition as being two of the firm's best sellers. On another page will be found an illustration of two pieces of furniture forming part of the Jacobean suite.

The True Artificial Limb Company, Niagara Falls, N.Y.—This company manufacture complete lines of artificial wooden limbs, invalid chairs, crutches, patent articulating ankle joints, etc., and their display covered various samples along these lines. In the manufacture of these limbs the company largely use willow wood as being, in its lightness and strength, superior to other grades for that purpose.

A. R. Williams Machinery Company, Limited, Toronto.—A prominent stand in the Machinery Hall displayed a collection of this company's various machines. The Williams Machinery Company cover a large field in the buying and selling of all manner of machinery, including woodworking machines. Among their exhibits those of special interest to the woodworker were an Eclipse pony planer, of which the Williams Company have the exclusive sale in Canada, a 20-in. planer and matcher, and a Beach saw table. The last-named machine is specially designed and built for the manufacture of shell boxes. As a novelty, the Williams Company had erected a model cannon, which they an-

nounced as "the Long Tom," and which stood at the front of the exhibit. This "cannon" was constructed wholly of American steel split pulleys. Another feature of this exhibit was the "Evinrude" motor, for attachment to row boats. Mr. Cronk was the company's representative in charge.

New Scale Williams Piano Company, Limited, Oshawa, Ont.—Pianos in dull or satin finish, circassian walnut, mahogany, oak, and walnut, in both grands and uprights, were to be seen in this company's exhibit. They also exhibited an electric player, lately patented by them, and turned out in its entirety at their factory. Mr. F. Trestail, the company's advertising manager, had charge of the exhibit.

Presentation to George K. Tyler

At Meaford, Ont., at the I. O. F. Hall, recently, the staff of the Seaman Kent Company held a farewell meeting in honor of Mr. George K. Tyler, who for a number of years had filled the position of Superintendent at the company's factory, and who was resigning to take up a more responsible position with Messrs. Knight Brothers Company, Limited, Burks Falls, Ont. The chair was occupied by Mayor Kent, President of the Seaman Kent Company, who in testifying to Mr. Tyler's work was supported during the evening by Mr. Cole, Sales Manager, Mr. J. A. Sinclair, Secretary-Treasurer, and others. During the evening Mr. Tyler was presented with a handsome locket and chain as a token of the regard in which he was held by his associates.

Mr. George K. Tyler, now with Knight Brothers Company, Burks Falls, Ont.

"Wisdom Teeth" is the title of an interesting booklet received from The Berlin Machine Works, Beloit, Wisconsin. It embodies concise illustrated descriptions of the company's bandsawing machinery, and is prefaced by "A Little Story of Lumber Conservation," which has a good business moral in it. It may be noted that the bandsawing machinery illustrated in this booklet forms but one division of the extensive line of woodworking machinery manufactured by The Berlin Machine Works. The company also make sanders (roll feed, endless bed, and belt types), matchers, moulders, surfacers, sizers, glue jointers, buzz planers, turning machines, matcher heads, specialties and many special purpose machines.

The Hardwood Market

LAST month we were able to report some improvement in the general trend of the hardwood market. Again we believe the trade to have progressed on a slightly improved scale as compared with four weeks ago. A considerable quantity of stock has been taken by manufacturing plants having War orders. Ash and walnut have been selling well, and oak has been in fair demand. The furniture factory trade has been looking up somewhat, although the purchases which have been made have been mostly in small lots for immediate use. Oak, birch and gum have been in fairly good demand from these interests, while some little improvement has been noted in the demand for various items required in the automobile and vehicle industry. Hardwood of the lower grades is being consumed steadily by the box factories, and generally there is greater assurance now of a fair fall business than there has been for some time past.

From what we can hear, manufacturers and remanufacturers, planing mills, sash and door makers, and allied trades, are still a factor in the business situation—an opinion which is substantiated by the following report on the general condition of the hardwood market contained in the last issue of The Southern Lumberman:

"Gradual expansion of demand for hardwoods as the fall trade opens up and consuming factories again more nearly resume normal operations is the feature of a quiet market this week. The improvement is coming slowly, and is reflected but little in prices as yet. Actual volume of movement or of orders booked has not as yet had opportunity to show much increase, but inquiries received are much more numerous, and are the cause of encouragement to manufacturers and dealers. For the first time in several weeks much of this inquiry is emanating from furniture manufacturers. Planing mills and box factories are also particularly busy, while the call from the automobile trade continues.

"Consumers generally seem to be now realizing that stocks in first hands are comparatively small, and that if their own depleted supplies are to be replenished that they had best begin by inquiry at least to locate the stock they want. Retail yard buying is slow, but sales to large mining and manufacturing corporations for construction and repair work is of encouraging proportions.

"The demand for stock for war purposes continues, particularly that for walnut for manufacture of gunstocks, and for low-grade material for crating of munitions. The demand for high-grade ash used for the armies in various ways, however, is said to be sagging somewhat.

"Relative demand for the several woods has changed but little from week to week during the past month. Oak, poplar, gum, hickory and cottonwood continue in good demand, with more activity apparent in chestnut. Maple and birch are also moving in fair volume.

"Cypress has begun to exhibit genuine improvement, not only for the general run of stock but particularly for lath and shingles. The latter have been dull for several months, but are now showing much brisker movement."

The Foreman Finisher's Equipment

Specially Contributed by W. J. Beattie

MOST manufacturers possess fairly good equipment for the use of their employees in turning out their goods—especially in the matter of machinery. However, many of them are inclined to think that when they have provided reasonably good machinery the rest of the outfit is not of much concern. The foreman finisher suffers, perhaps, in this respect more than the other heads of the various departments. He is supposed and often expected to get his colors mixed and do his necessary experimenting in any kind of a hole or corner when, for the expenditure of a little material and labor, comfortable quarters could be provided for him.

A small room, 8 x 10, would do for most plants, centrally located and erected where plenty of light can be had. A window or two looking inwards may be advisable, except from an insurance standpoint. The interior of this room can be completely covered, including the floor, with galvanized iron, before the necessary shelving is erected. The first shelf should be high enough to allow space for the usual properly labelled five gallon tins. The rest of the shelving could be set apart according to requirements. A combination desk and a cabinet could be conveniently let into the shelving at the right place and should have a lift, or, better still, a drop lid which would close up flush with the face edge of the shelving and so be out of the way when not in use. Above the desk the pigeon hole cabinet for holding sample block colours of finishes could be enclosed by one or two doors. The sample blocks should be labelled on the under side with the finish formula, date and any other necessary information—each kind in its separate labelled compartments, so that any information can be obtained without loss of time.

The chief advantages in lining the room with galvanized iron are cleanliness, and fire protection, as all the varnish pots, etc., are placed in there over night. Anything dropped on the floor, for instance, can be easily wiped off and the place can generally be kept spotless with little trouble. The room should also be equipped with a pair of small scales similar to the ones used by druggists. A suitable pair can be purchased for three or four dollars. A graduated glass for measuring small quantities of liquids is also a necessity.

A room laid out on the foregoing plans, having a light step-ladder for reaching the high shelves and a low mixing table about 20 in. high with the top covered in galvanized iron zinc, would, it is believed, prove a great help and a source of profit and pleasure to the foreman finisher.

Methods for Finishing Walnut

By Rudolph Kilbourne

WALNUT is with us again, and, along with gum, will be one of the most popular woods during the next decade. For many years black walnut carried all before it as the most popular fancy wood of its day. But when men lost their heads in an effort to produce something outlandish in the way of finish, and began to paint this beautiful wood until one could scarcely tell whether it was wood or iron, interest in it began to wane, and walnut became a thing of the past, and to many a quite unknown wood.

It is safe to say there are thousands of finishers in the country, who have had ten years' experience and more at finishing, and who have never finished a piece of genuine black walnut. It is an easy wood to finish, however, and finishers have nothing to fear because of its return, provided the monstrous notions that marked the closing years of its former reign and brought it into disrepute do not return with it.

In justice to the finishers of that day, let me say that the fault of this wood being spoiled in the finishing was not theirs. Loud and long were the protests that went out from the finishing fraternity against the desecration, but they died away on the air. The goddess, Fashion, held high carnival and swept everything before her. "Darker and darker yet," she cried, and, in response, men and women, with all sense of the artistic crushed out of them beneath the heel of this relentless monster, bought cans of ebonizing stuff, and beautiful walnut furniture, as well as walnut and rosewood pianos, calmly met their fate. With an unblushing disregard for consistency, the goddess of fashion, having thus reached the climax of absurdity, swung round and marched in the opposite direction.

This reaction brought the people to their senses. For many it was a most disagreeable awakening, and many pianos and valuable pieces of furniture were returned to the factories, and, at great expense, scraped off and refinished. It is to be hoped that in this case history will not repeat itself, and that the artistic sense of refinement that has been so carefully cultivated by lovers of the aesthetic will not be so ruthlessly outraged again.

Walnut may be finished in various shades, to suit individual tastes, many of which shades are very beautiful. But in making these shades care should be taken not to depart from the "walnut" color. No matter what these various shades may be, they should all be

such that they will blend with the true walnut color. During the early part of the period when walnut was at the height of its fame as a popular fancy cabinet wood, and when the art of finishing as we have it today was almost unknown, or quite in its infancy, this wood was finished with a greenish cast made by staining with umber. This tint had no claim upon the aesthetic, and it is to be hoped it will not be revived.

Browns and goldens are the shades to which this wood will most readily lend itself. Walnut submits itself readily to an oil stain finish and these shades may all be made with oil stains. But walnut crystals dissolved in water make a most beautiful shade of brown. This stain should not be made very dark; about 5 oz. of walnut crystal to 1 gal. of water is sufficient. Heat the water to a temperature of about 150 deg. F., and pour this over the crystals, stirring constantly until all are dissolved; allowing it to cool before using. Apply the stain with a brush, and, when thoroughly dry, sand smooth with No. 00 sandpaper. In sanding be careful and not sand through the stain. Then fill in the ordinary way. If there are any sap streaks in the wood, stain these streaks first, if it is desired to even them up, and, after they are dry, stain the whole surface.

A most beautiful shade of very light walnut may be made by using 3 oz. of the crystals to 1 gal of water, and, when the stain is thoroughly dry, shellac the wood with a very thin shellac, about 1¼-lbs. of gum to a gallon of solvent. When this is dry, sand lightly with very fine paper, then fill with a medium dark filler.

With walnut the general tone and effect of the finish may be varied considerably by varying the filler. Especially is this the case with much of the sliced veneer. This has considerable pore, and the difference in the effect produced between a light or dark filler is very distinct. This difference is not so marked if the wood is fine-grained.

Walnut finished with a very slight golden tinge and a dark pore is very beautiful and is likely to become one of the most popular shades. This may be produced by adding a little oil yellow to the oil with which the filler is made and filling the wood without first staining. But the oil yellow must be the only liquid coloring matter in the filler.

In this day of specializing there are many things that the finisher can buy prepared, ready for use, from some firm making a specialty of wood-finishing supplies, and buy them to much better advantage than he can prepare them himself. But in the case of wood fillers the finisher can usually get better satisfaction from the filler he prepares himself than from that which he buys. I am familiar with the arguments that are advanced against this contention, ie., that the supply houses have specialists whose business it is to make filler; that in making it in large quantities there is greater uniformity, and that the finisher has not the ponderous machinery necessary to crush and grind the materials and afterward mix them together. These arguments are all beside the mark, because very few, if any, of the specialists in filler-making have all these things. And, even if they have, that would not strengthen the argument. Ponderous machinery is not necessary in the making of filler. It is necessary to crush quartz and grind it into silex for the making of filler; but how many specialists in filler-making ever saw one at work, to say nothing about using one? Massive machinery is necessary in the making of oils. But how many specialists in the making of wood fillers make their own oils? The crushing of quartz and the extracting of oils is each a business by itself and has no connection with filler-making, and the men who do these things for the specialist will do them just as readily and equally as well for the finisher.

One thing the specialist has, that the finisher has not, is power machinery for mixing the filler, but that is more a matter of convenience than of necessity. The specialist makes his filler by the ton, and if he prefers to mix it in that quantity he will require power machinery to do it. But the finisher will make it in lots of 50 or 100 lbs., and for this quantity no machinery is required save a good pair of hands. The finisher who makes his own filler can be equally as certain of uniformity as he would be if he bought it from a specialist. The specialist is not the man who does the actual work of making the filler. His business is to determine the proportion of the various ingredients used, but the actual process of preparing the filler for use is carried out by men who, perhaps, know very little about the nature of the materials used. If they make a mistake in the proportions used they will never know it, because they will never see the filler after it is made, never see it used, and consequently will never be able to correct the mistake. The finisher who uses it will detect something wrong, but, not knowing the formula, he cannot tell where the trouble lies, consequently he cannot correct it.

In the case of the finisher who prepares his own filler, he will weigh and measure everything himself, and thus minimize the possibility of mistake; but if an error should creep in, he will detect it at once, when using it, and, knowing the formula, he will correct it.

Nearly all fillers contain japan as a drier. Filler containing japan works hard and stiff when it gets old, and does its work less effectively. Ready-mixed filler may be made a week or it may be made a year before the finisher gets it. To give best results filler should not be used within twenty-four hours after mixing, neither should it be prepared more than about ten days in advance of using. The only way of having fresh filler is for one to make it himself.

I have gone thus fully into this question because I know there are a great many finishers in the country who prefer to make their own filler, but who have to keep up a constant fight with the manager, who has been persuaded by some smooth-talking salesman that specialists in filler-making are the only people who can make filler.

There are two kinds of filler. There is the filler intended solely for filling the pores; then there is the combination stain and filler. The former should contain no liquid coloring matter, nor any coloring matter that is soluble in oil. The pigment alone should be colored. This may be done with either drop black or vandyke brown, or a combination of both. These should be ground either in pure linseed oil or japan. If ground in oil, make sure that it is pure linseed oil. Pure silex should be used as a base.

In the combination stain and filler, where a brown shade is desired, asphaltum or black japan may be used to color the liquid, which will stain the wood, the drop black and vandyke brown being used to color the pigment, the quantity of coloring matter used in the pigment to be governed by the depth of color desired in the pore. Combination stain and filler should be used only on wood that has a strong, bold figure. Fine, fancy veneers should not be stained, and should be filled with a filler that has color in the pigment only.

It is quite probable that for some considerable time

to come individual tastes will determine the shades of color in which walnut will be finished and that we will see a large and varied assortment, but as time goes by some of these will become more popular than others, and these will likely be standardized. This gives finishers an opportunity to distinguish themselves by striking the popular fancy and giving the world a finish or shade of finish that will become universal.—Veneers.

Problems in Finishing Autos

"I am desirous of obtaining some particulars on refinishing autos. I might say that all I know of refinishing is what I picked up myself. I have refinished one car and have several others waiting. In replying, please remember that I am in a small town and everything has to be done by hand with such material as one can get. Some of the bodies are in good shape and will only need varnishing, while others will need the old finish taken off down to the tin. What do you recommend as the easiest and quickest way to remove the old paint? I will give you the method I used in the car I finished which body was in good condition and did not need the old paint removed. First I washed the car off, then used a very fine sandpaper and sandpapered it off nice and smooth; after this I gave it two coats of drop black which I got at the hardware store in a rather paste form, and had to thin out with turpentine. Then I gave it three coats of rubbing varnish, rubbing each one down with ground pumice stone, and then gave it one coat of finishing varnish.

"The result was a very good job, but the brush marks of the drop black (which dried quickly) showed through. Also it had a very gritty surface. I spent four hours washing the last pumice rubbing, then I brushed the whole car off with a soft brush, especially the places where I could not wash the pumice off. Is there any special way of removing the pumice outside of the way I have mentioned?

"Could I have mixed up a drop black myself that would be cheaper than buying at the hardware store? How should it be applied so that the brush marks would not show through the varnish? I thinned both the rubbing and finishing varnishes a little with turpentine, as I found them a little stiff to work without. Should this be done?

"The varnishes I used are manufactured by the International Varnish Company, which is the Canadian branch of the Standard Varnish Works. The rubbing varnish which they sent me is called (A) Pale Quick Rubbing, and the finishing is called Finest Durable Body Varnish. Do you think I can get any better than this for the purpose?

"I trust I have made myself clear and you will be able to give me some help which will assist me in this work. Should the pumice stone be used dry or mixed with water? I used it mixed with water."—**R. S. Brereton, Claresholm, Alta.**

The above letter, which was submitted to the Furniture Manufacturer and Artisan, is answered in the following manner for that journal by Walter K. Schmidt:

If the finish must all be removed from a wood body, remove it with torch, or with varnish remover. Do not use a torch on a metal body; use varnish remover. Also, don't use a torch on a paper body. Start the new finish on wood bodies with first one coat of gray lead. Putty this and apply four coats of rough stuff. Rub the rough stuff to a level surface with a rubbing brick made for the purpose. Use plenty of water in rubbing. On metal bodies use no lead or rough stuff. Use a metal primer made for the purpose, two coats on the clean metal. Sand this smooth with fine sandpaper. Bring up a paper body same as a wood body. Start to color with the color wanted, with color ground in Japan, and thinned to the consistency of milk. Use a soft brush and there will be no brush marks. Over this apply two coats of color varnish the shade wanted. Over this apply one or two coats of clear rubbing. Use moss or steel wool to smooth up slightly between coats.

Now we are ready to rub out for the finishing coat. Rub with felt, pumice stone, and water, to a smooth surface. Wash up clean with a sponge and plenty of water. Dry with a damp chamois skin. Wash all cracks, corners, and edges perfectly clean, then dust off with a clean duster and put on the finishing coat.

When an auto just needs revarnishing, it is best to give it one or two coats of color varnish. Rub it out a little and then give it the finish coat. Flat color is not good in this case. Or it may have one coat of color varnish and one coat of clear rubbing to rub on, and then finish it. It is not best for you to try to mix your own colors. You can buy any color varnish that gives you color and body at the same time, and that will cover solid. Apply them heavy, same as a varnish, and do not thin them unless it is very necessary, as when they get thick with age. Do not thin either rubbing or finishing varnish, as it impairs the lustre. As to using pumice, it can be mixed with water, thick. Or it is as well to dip the felt in water and then pick up the pumice on it. Use plenty of water in rubbing. Never use pumice dry. Use your finishing brush for finishing only, and hang it up on a wire, in varnish, when not in use.

There is no way to remove the old paint except with varnish remover, or with a blow torch. As you say you are not an expert, you may be sure you will have some brush marks, even in your varnish. Practice will overcome this. Put varnish on as heavy as you can and make it lay without sags.

Ebony and its Imitations

THE black keys of pianos are sometimes made of ebony. It forms parts of many other musical instruments, handles for small tools, and novelties of many kinds. It comes from Ceylon, Madagascar, Africa's east coast, and from other tropical countries. It is of many colors, ranging from jet black to brown and green. The blacker it is, the more valuable. Two thousand years before the days of Abraham the Egyptians were cutting ebony under the equator on the east coast of Africa and shipping it to furniture makers in Egypt. Some of that furniture is in existence to-day.

The cost of ebony tempts counterfeiters to imitate it. The most common imitation in this country is holly. It is worthy of note that one of the whitest woods in the world should be chosen to imitate one of the blackest. The holly is boiled in hatter's dye and becomes so black that no one suspects the counterfeit if he judges by the color alone. The fine grain of holly contributes to the deception, but the weight gives the secret away. Ebony is twice as heavy as holly. This imitation is often employed in making billiard cues and in other inlay work where the weight is not taken into consideration.

In Europe one of the most common imitations of ebony is prepared from the wood of fruit trees, preferably pear. It is dyed in much the same way as holly,

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WOODWORKER PUBLISHING CO., LIMITED
345 Adelaide St. West, Toronto

and it takes a fine polish which closely resembles ebony.

Other imitations are numerous. They are found in tropical America and in the tropical countries of the East. Of late a timber from Africa, called wat-wood, has been mentioned as a successful substitute for ebony; but the wood appears not to be mentioned under that name in any of the standard books on commercial timbers, and its botany is uncertain.

Even the United States has a candidate for favor as an imitation of ebony. It grows along the Rio Grande, and the people in that region like to have it called Texas ebony. It is little akin to real ebony, but is a locust tree, and a denizen of the jungles of mesquite, huisache, devil claw and other thorny brambles which cover the hills and ravines of southwestern Texas. It is known to botanists as Zygia flexicaulis. Efforts to put it on the market as ebony have not been successful, for the probable reason that its color is unsatisfactory. Some parts of the trunk may be as black as ink, but there are stripes and zones of wood as yellow as bodark or as brown as walnut, and it is not easy to cut out the black pieces in shapes and sizes suitable for uses in cabinet making.

The railroads in that region cut the wood for ties, and as far as it may be judged by experience, it will last forever. No one ever saw a rotten railroad tie of this wood. Worms devour the sapwood, which is yellow and half an inch thick, but they can make no impression on the heartwood, and it becomes harder the longer it is in use.

Texas ebony is valuable as fuel. It is at its best under the boilers in the cane-grinding mills near Brownsville; but it is not popular as stove wood because it is said to generate so hot a blaze that the stove is burnt out. The damage to the stove is probably not due so much to the extreme heat developed by combustion as to the acid set free in process of burning. When the northers come down across the plains and send shivers through the thin-blooded Texans along the Rio Grande, the fireplaces are piled with ebony and the red blazes make their presence felt, while the odor contains a strong and not wholly pleasant suggestion of burning leather.

Accounts have been published recently of artificial ebony which is said to be meeting requirements fairly well in some instances, but it must face failure in others. It is manufactured by mixing sawdust and blood and subjecting the mass to enormous pressure. The color might be all right, and possibly the weight and polishing properties may be satisfactory, but the strength ought to be thoroughly tried out before the composition is accepted for situations where great strength is required.—Hardwood Record.

The war is bringing out the latent resources of the European countries. The hazel is usually a small shrub in England. Some of the largest may be usable as barrel hoops, ladder rungs, and crating; but that has been about the limit of usefulness heretofore. This is the bush that bears the filberts or hazel nuts of commerce. The British navy has found a use for this wood. The stems are tied in bundles as thick as an oil barrel, and about six feet in length, and the bundles are used as fenders for battleships, to break the force of the impact when the vessel goes alongside a wharf. Seven hundred rods are required for one fender, and the largest rod must not exceed an inch and a quarter in diameter. Inspectors are being sent out to look up the available supply of hazel in England.

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Veneers and Panels

A Few Points on Modern Veneer Room Equipment

Contributed by H. W. Gould

IT is self-evident that one can judge something of the facilities afforded for doing work by the quality of the work turned out. There may be exceptions to this, but a mechanic is always handicapped by not having the proper tools, and no less does the argument apply in the veneer room, where one works at a decided disadvantage by not being equipped with the proper appliances.

The equipment of the veneer room may be divided into Necessaries and Conveniences. Of the Necessities we have the mechanical glue-spreader, the hydraulic press, copper glue-heaters, caul box, and sufficient cars, retaining rods, and cauls to handle the work required. These are really too well-known to call for comment, but it may be as well to say a word about the cauls. Personally I consider aluminum cauls far superior to any other. I have known them to be used continuously for five years and to be none the worse at the end of that time. They should never be scraped, but cleaned often with something soft, such as "waste," and then they will not get thin in spots or become crooked, and they will have the advantage of being very light to handle, and also hold the heat well, without being hot at the start. Also they leave the veneer in excellent condition.

I have obtained the best results from a prepared wax—an American product—used on aluminum cauls. This does not penetrate the veneer as paraffin, tallow, and oil do, and it lasts longer on the caul.

Of the Conveniences there are many. The temperature controller on the glue-heater is very handy, although not absolutely necessary. The same may be said of the taping machine, clipper, matcher, and redryer, although some provision must be provided for drying the veneer before it is laid.

Where a great quantity of work is put through, these appliances are undoubtedly necessary, but in the case of smaller shops a drying room with plenty of circulation will suffice. Also, provision must be made for drying stock after it comes from the presses. Preferably there should be a warm room with plenty of circulation and piled with strips at least three-quarters of an inch thick.

It is well enough to speak of Necessaries and Conveniences, but in the Veneer Department—and in every other branch of the trade, for that matter—up-to-date appliances and machinery avail little without an intimate knowledge of how to handle them. So that the most important piece of equipment in the modern Veneer Room is the brain of the user.

Increasing Use of Veneer in Trunk Making

IT is difficult for one who has not been in close touch with the industry to get a fair conception of the extent to which veneer is used in trunk making and the various applications which are made of it. This use of veneer, observes a writer in The Hardwood Record, has probably developed more in the past twenty years than it has in many other lines where it is more generally known.

Among the displays of trunks to-day one may find not only the entire body made of built-up veneer but many fittings for the interior, including not only trays, partitions and compartments, but also three and five ply hangers as a part of the equipment of the wardrobe type of trunk. Some of these trunks show the use of more veneer on the interior and in the fittings than is involved in the making of the entire body, and it is the interior uses that constitute one of the interesting features in the use of veneer in the trunk business and perhaps open a market for wood that heretofore people have sought to place elsewhere.

About twenty years ago there was what seemed at that time a pretty lively interest in the use of veneer for the making of trunk tops. Just when the use of veneer for this purpose began is not known, nor is it very material to the present purpose. About that time, however, the matter was receiving attention from the makers of built-up veneered work.

As wide stock in lumber became scarce and high in price, and as the makers of trunks kept casting about for the greatest strength with the smallest weight, interest was shown in the idea of using built-up lumber for the trunk bodies, for the sides, ends and bottoms as well as the tops. The entering of built-up lumber into this work enlarged the field for the use of veneer, for to make the entire body of the trunk of built-up stock called for more than four times as much veneer work as was involved in making the top alone. This work gradually enlarged until, perhaps ten years ago, the majority of trunk bodies were being made from built-up stock as well as the tops. Some solid lumber was still used, and perhaps there is a little yet, but the point has been reached where trunk making, so far as the woodwork is concerned, is practically a veneer and built-up lumber proposition. It makes a business of much more magnitude than most men have any conception of. To-day trunks are made that are very elaborate in their interior equipment. There are complete wardrobes, and most of the trays, compartments, etc., are made of veneer or built-up lumber, three and five-ply, because in this way the manufacturers can secure the maximum of strength with the minimum of bulk and weight.

To get an idea of the various uses of built-up work in connection with trunk making one should go into

a store where a full line of these elaborate trunks is kept, and ask to see the offerings. You will be surprised both at the quality of veneer used and at the various forms in which it enters other than the body and top of the trunk itself.

Incidentally this use of built-up stock for clothes hangers in wardrobe trunks should suggest a line of development in the use of veneer for coat and skirt hangers for the closets and wardrobes in the home. There is a big field here which, if properly cultivated and thoroughly developed, should consume an enormous quantity of plain built-up veneer stock.

Veneered Panels in the Making at Well-Established Woodstock Plant

MESSRS. Hay & Company, Limited, Woodstock, Ont., manufacturers of sewing-machine woodwork, veneered panels, etc., whose fine plant is shown in one of the accompanying illustrations, are one of the best-known firms in Canada manufacturing veneer to go into the furniture trade. Originally these veneers were used entirely in their own product, but several years ago they commenced selling three and five-ply veneers to the trade, and now number among their customers firms in all parts of the Dominion. Their veneer panels are in demand for a variety of uses, and they have retained their customers regularly from the first time they opened an account with them.

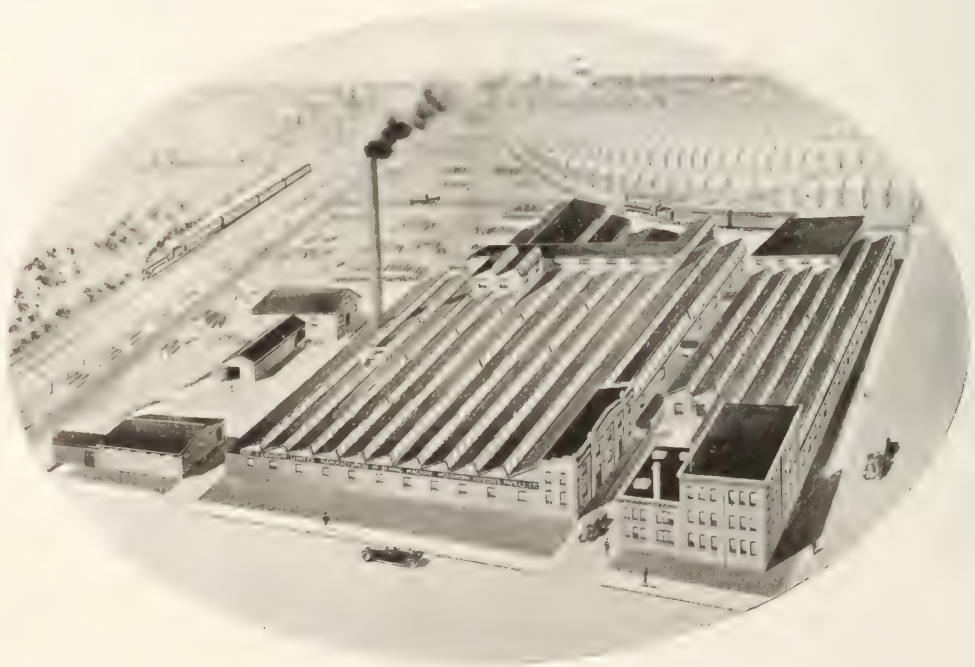
Messrs. Hay & Company do a large business in sewing-machine woodwork and other specialties. Formerly their foreign customers secured part of their requirements from European countries now affected by the war, but with the diversion of this trade their business has been increased so that they have been able to run full time with a full staff since last October.

Their regular Canadian trade in single ply veneer, panels, etc., has been somewhat affected by the war, but Messrs. Hay & Company have entered on a new line of supplying the building trade with stock panels, in quarter oak, plain oak, birch and mahogany, of which they carry a large quantity in different sizes. A large number of these panels were formerly imported from the United States, more especially in the North-West.

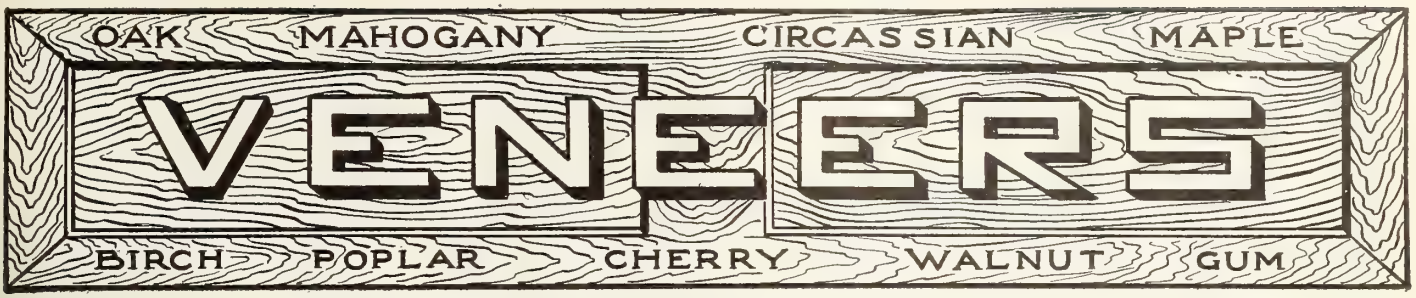
The plant, which is one of the largest of its kind in Canada, and thoroughly modern in every respect, is a one-storey building of saw-tooth roof construction, and has 75,000 square feet of floor space. One feature of the building is the splendid light provided by continuous rows of skylights. It is fully equipped with woodworking machinery, including many special machines for sewing-machine woodwork and other wooden specialties which the company manufacture.

Hay & Company, Limited, have splendid shipping facilities, with two sidings on the Grand Trunk Railway and inter-switching communication with the C. P. R. Their logs are shipped in by train from the north and outlying points. Large quantities of oak, walnut, and mahogany veneer are also imported from the United States.

The logs are cut into veneer on two veneer lathes, and dried in an automatic veneer drier 80 feet long and 8 feet wide, through which four separate rows of veneer are constantly passing. Some veneer is also dried in kilns, and in addition there are plate driers for redrying and flattening. The panels are glued up on three hydraulic presses, the largest of which is 72 by 54 inches, and several hand-power presses. After being glued up the panels are re-dried in an automatically controlled kiln—this process eliminating all moist-



Messrs. Hay & Company's plant at Woodstock, Ont.



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ure and ensuring that the panels are kept absolutely straight and flat, leaving no chance for shrinkage. A recent installation is a scraper, which, used in conjunction with sand belts, gives the product that smart, even surface which is so much desired by the trade.

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The present business of Hay & Company, Limited, was established twenty-one years ago, under the management of the late Mr. James Hay, who died in May, 1912. The Vice-President and General Manager is Mr. T. L. Hay, who has been connected with the firm since its inception—twelve years as Superintendent, and the last three as Manager. Mr. W. A. Smith, the Secretary-Treasurer, has been with the firm for fourteen years; and the heads of the various departments generally have been with the firm from the beginning

Walnut sewing-machine cover—a product of Messrs. Hay & Company's plant.

of the business. Many of the men have been employed by the firm from boyhood.

Messrs. Hay & Company give employment to about one hundred and fifty men. The plant has the reputation of running steadily the year round. At no time during the last twenty years has it been shut down for more than two weeks.

It is gratifying to us to be able to state that Mr. R. Ferguson, of Toronto, one of the best-known of our contributors, was awarded two first prizes and one second prize for three entries he made at the Canadian National Exhibition. These were: a first prize for an inlaid mahogany clock; a first prize for an inlaid collapsible walnut tray; and a second prize for a carved mahogany spinning chair.

The London Timber and Woodworking Machinery of a recent date makes record of a remarkable piece of manufacturing. A contractor made and delivered to the War Department an order for 40,000 wheels, made chiefly of oak and ash, for guns and wagons, and not a single wheel was rejected. One of the most remarkable parts of the transaction was that within ten weeks after the trees were felled in the forest, the wheels were delivered to the War Department.

Laying Crotch Veneers

OF all the veneers, the crotch is the acme of perfection in its possibilities. The crotch in its form does not mean very much to the uninitiated, but to the trained and experienced it contains a world of possibilities.

There are no two alike; each is different from the other. Every one requires separate care and different handling if we would get all there is out of it. After it has been duly treated, sliced and dried, it is a question how best to apply it, and that leads me to mention a few facts that I have learned in the use of crotch veneers.

Where it is possible, and in order to get the best results, I would use only the veneers from one log to finish the work in hand, for seldom will two logs furnish similar veneers.

The veneers should be kept in a cool place until used. I would suggest cold storage of uniform temperature, not higher than 30 deg. F. Heat is fatal to good results.

Crotch veneers need more glue than any other kind of veneers. The pores should be filled and saturated with glue in order to make lasting work. The sin of this age is the sparing use of glue.

Air is fatal to work veneered with crotch. It should be protected from the time it is taken out of the press until it is time to apply the first coat of varnish. I generally use paper over the face of the veneer. Often enough glue comes through to hold the paper in position; if not, I either tack or tie paper over the piece.—Wm. F. Meyer in Veneers.

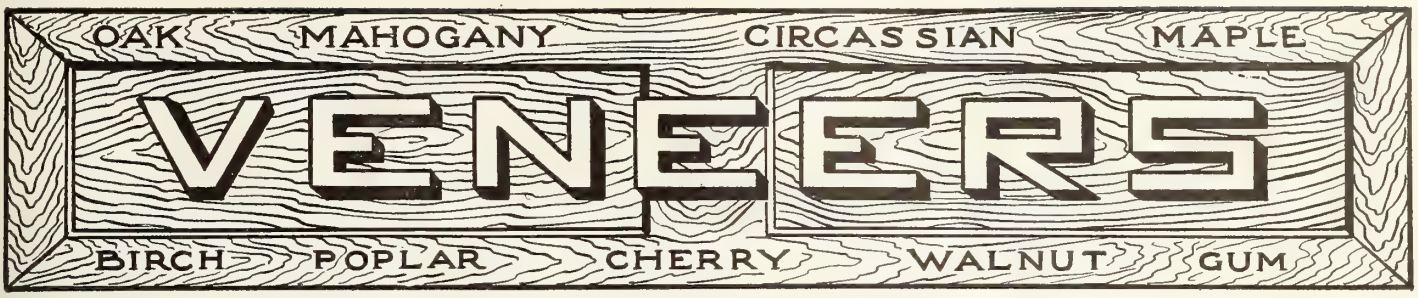
Temperature in the Glue Room

EVERYTHING is constantly changing—even to men's minds. The ideas we held a short time ago are now old-fashioned, and we must lay them away, because new ones have come to take their place. What I have in mind at present is the idea some of us used to have regarding the temperature of the glue room.

Formerly, it was held that the higher the temperature at which the glue room could be kept, the better. But this view has moderated considerably lately and many thoughtful persons have come to the conclusion that a moderate, but even, temperature, say 70 deg., is ideal for both the glue and the men using it.. Everybody, I think, is still agreed that the room should be kept free from drafts and anything that would suddenly chill the glue, but the high temperature for the room is to be buried in the same grave with the high temperature for preparing glue.

Also, those who at one time held the opinion that the wood upon which glue is to be spread should be heated hot, are moderating their views; they are satisfied now to have it merely warm—but a little higher than the temperature of the room. This prevents the glue from chilling and opens the pores of the wood sufficiently to allow the glue to enter and secure a hold. When wood is heated hot, too much glue is taken up. There is in the first place an unduly enlarged pore, as a result of the heat. Then when the wood cools off, the air in the pores beneath the glue contracts as it cools off, creating a suction which draws the glue farther into the wood; and this is liable to occur to such an extent that the joint is robbed of the glue.

We are beginning to be more reasonable in our views and to believe that a temperature best suited to



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man's requirements is, after all, best suited to the glue. This change of mind has resulted in making the glue room a pleasant place in which to work; as comfortable in point of temperature as any other part of the factory. And along with all this comfort has come a better quality of work. Let us remember that everything should be in harmony, and that when things look as though sacrifices are necessary on the one hand in order to produce good results on the other, there is usually something wrong, something out of joint that ought to be investigated. If we approach the matter with an open mind, we will be sure to find the cause of the trouble, and a general improvement will be the result.—The Woodworker, Indianapolis.

The Mechanical Veneer Drier

VENEER driers have come to be thought of as having the main advantage of drying veneer promptly and getting it ready for use more rapidly. This advantage is present, and it is one that generally even alone would make it worth while to invest in a veneer drier. Drying, of course, is the most important consideration in connection with the production of veneer, but the mechanical veneer dryer has the added advantage of drying the veneer without causing it to buckle up. Flat veneer has a much better appearance, and it is undoubtedly less trouble to work than the commonly wrinkled material that is the result of air-drying. The stock is kept flat by the drier through the whole process of drying, and it only requires proper looking after in order to ensure thorough drying. The veneer drier saves time and produces better looking veneer stock. It is well to bear in mind, however, that the work should not be speeded up excessively. The mechanical action of the drier ensures flat work, but the degree of dryness depends on the time, and it will happen occasionally that a rush job will come out looking well enough but will not be dried properly. The dryness of the veneer is the main thing. In air-dried stock the dryness can be judged by the buckles or wrinkles, but whether stock be dried mechanically and comes out flat, or whether it be dried in a kiln or slowly in the natural atmosphere, the dryness must be accomplished.

Veneer Can Be Too Dry

A recent experience of one of the most prominent and efficient veneer manufacturers shows a wide field for misunderstanding and error on the part of users of veneer in the handling of stock. This company has a large customer in its own town and has been in the habit of giving just the service that was desired in the way of delivery. It happened a short time ago that the company wanted a line of drawer bottoms in a hurry and in endeavoring to fill the needs the veneer company sent over some stock that had just come from the drier without having had time to thoroughly cool off. Part of it went into the line in which it was to be manufactured and in a short time the plant manager called up the veneer company's office saying the veneer was no good, that he expected it would not be as it was still warm when it came over and that it was not properly dried and was twisting out of shape. The veneer man, knowing the fault did not lie in the veneer, hastened to question his customer. It seemed that the stuff had been used up almost as soon as it came in, had been put into place and the articles finished while the veneer was in the condition in which it had come from the drier. In other words, it was too dry. It has been reduced to a state of extreme dryness and the natural cause was that the moisture content was considerably below the moisture content of the surrounding air. However, as the stuff was fastened into place while it was still warm it had not had time to absorb the moisture due to its heated condition, which was practically impossible. Gradually as it cooled off after being put into place the moisture was reabsorbed up to the normal content and there was only one thing for it to do, and that was swell until it twisted out of shape. .

In other words, the cause was indirectly the result of too great a hurry on the part of the manufacturer and directly the result of the inability of the veneer to absorb moisture to a normal percentage while still warm.—Veneers.

In the past, men have been ringing the changes on the value of soaking glue from ten to twelve hours before dissolving. The time is not far distant when men will recognize the value of using glue as fresh as possible, and point out the folly of soaking more than half an hour, especially in warm weather. When all men become honest, so much so that there is no longer any occasion for suspecting that any man would take advantage of the possibility of mixing, without detection, an inferior article with a barrel of ground glue supposed to be of the best quality; when that time comes, all glue will be ground When the glue is ground, the necessity for soaking over half an hour no longer exists. The shorter the time that glue is in the fluid state the better, and the shorter the time allowed for glue to soak, the less danger there is of decomposition setting in before it is used.

A Typical Case

He managed the shop in the old-fashioned way
That his ancestors ran it before him,
With only the same old routine every day,
And no troubles or worries to bore him.
His methods were primitive, faulty and crude,
Yet he never deplored his condition;
But all innovations and changes he viewed
With a frigid and gloomy suspicion.

He would not complain that his trade never grew
Just so long as it didn't grow lighter;
"Let well enough be" he regarded as true,
Though no maxim is weaker or triter.
But one day the business began to run slow,
Like a flywheel that loses momentum;
And quarterly dividends started to show
A decided decrease in per centum.

An up-to-date neighbour, who chanced to come [round
Just at that psychological minute,
Suggested a technical journal, but found
That the "boss" had no confidence in it.
He vowed it too trashy and piffling to read,
Notwithstanding the other's denial,
But, after a great deal of talk, he agreed
To subscribe for a year as a trial.

At first he regarded the "ads." and the text
With the eye of a mental dyspeptic;
But, finding they solved many problems that [vexed,
He became less and less of a sceptic.
In time, their sincerity banished his fears,
And his nature grew buoyant and sunny,
Because, with the progress he made through the [years,
Most important of all, he made money.

News of the Trade

T. Z. Smith will build a factory at Matsqui, B. C., for the manufacture of boxes.

R. D. Hall is about to erect a factory at Petrolea for the manufacture of gates and woodenware of all kinds.

H. A. Brochu, 294 St. Catherine Street East, Montreal, is desirous of obtaining information and prices on woodworking machinery.

The Spiesz Furniture Company, of Hanover, has recently secured an order for ten thousand shell boxes from the Dominion Government.

The Gidley Carriage Company, of Penetang, Simcoe, now insolvent, recently made assignment to Norman L. Martin, Wellington Street, Toronto.

The firm of Legault, Leger & Bourgon, sash and door manufacturers of Montreal, Que., has been dissolved, and is succeeded by Leger, Bourgon & Ladouceur.

Wrights, Limited, are contemplating the erection of a factory at Sydney, N. S., for the purpose of manufacturing furniture. The structure is to cost approximately $25,000.

Mr. George Kersley has resigned his position as General Manager of the Dominion Mahogany & Veneer Company, Limited, Montreal West, Que. Mr. H. Lefeber has been appointed Manager.

A new company has been incorporated in Toronto for the purpose of manufacturing pianos, piano-players and all kinds of musical instruments, music cabinets, piano benches, stools, etc., and will bear the name of The Cecilian Company, Limited, the capital stock being fifty thousand dollars. Among the incorporators are Messrs. J. E. Hoare, F. Baxter, A. T. Craig, T. H. Barton and S. H. Stott, all of Toronto.

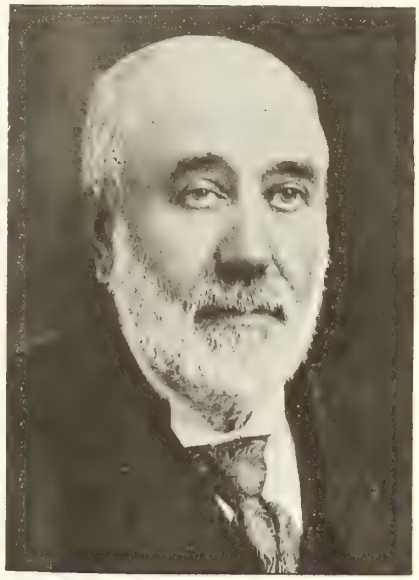
An Orillia despatch states that the Tudhope Carriage Company has purchased all the stock and materials of the Dominion Carriage Company, Toronto, and is removing them to Orillia. They have also taken over the orders of the Dominion Company, and will fill them from their Orillia factory. This will ensure a considerable amount of added work during the coming winter. The Dominion Carriage Company has disposed of its factory to the Chevrolet Motor Company.

As a result of the war, the Chesley Artificial Limb Company, at Hantsport, Nova Scotia, anticipate a much larger amount of business than in the past, though the company has been doing a fairly good trade during peace times. The firm's special line of manufacture is artificial legs, of which they have an enormous amount in stock. Willowwood is used in the construction of these limbs, the company claiming that it possesses many advantages over other varieties.

The London Art Woodwork Company, Limited, is the name of a company newly incorporated at London, with a capital of $40,000. The incorporators are Messrs. J. Keller, E. R. Dennis, M. F. Forristal, J. J. Callaghan and P. J. Mugan, all of London, Ont. The products of the newly-formed company will consist of general woodworking supplies, along with lines of fittings, furnishings and supplies for schools, banks, offices, lodges and household furniture.

The late Andrew Malcolm

Quite a number of our readers knew the late Mr. Andrew Malcolm, President of the Andrew Malcolm Furniture Company, Kincardine, Ont., whose death was recorded in the August issue of The Canadian Woodworker. Mr. Malcolm



Andrew Malcolm, veteran furniture man whose lamented death occurred recently at Kincardine, Ont.

was seventy-five years of age. He was a native of Killearn, Scotland. At one time he represented Centre Bruce in the Provincial Legislature.

News comes from Stratford in regard to the removal of the Stratford Davenport Company's plant from the old Kemp building to the new one of the Diebel Fruniture Company in Stratford South. The factory will specialize in the manufacture of frames for all lines of furniture, and it is the intention of the company to supply the various Stratford concerns with these frames. Orders from other furniture centres in Ontario have also been booked. It was largely with a view to being conveniently near the factory where these frames are made that the Stratford Davenport Company took over the two upper storeys of the Diebel Building.

Second-Hand Woodworking Machines

Band Saws—26-in., 36-in., 40-in.
Jointers—12-in., 16-in.
Shapers—Single and double spindle.
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Rip and Cut-off Saws; Molders; Sash Relishers, etc.
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8

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8-9

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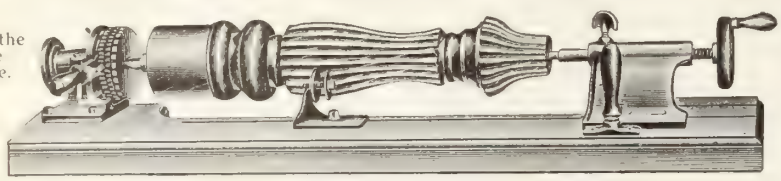

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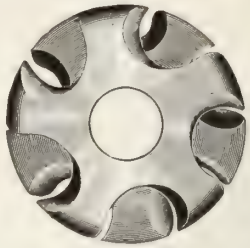
Swings any diameter up to 8 in. and may be extended to any length.
Spaces automatically numbers 1 to 48.

Ask for circulars of Fluting Heads, Twist Machines and Twist Sanders.



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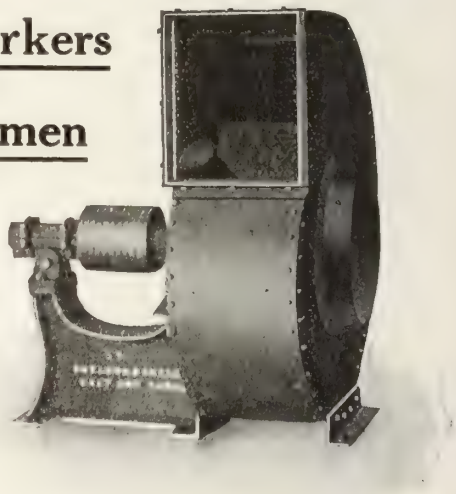

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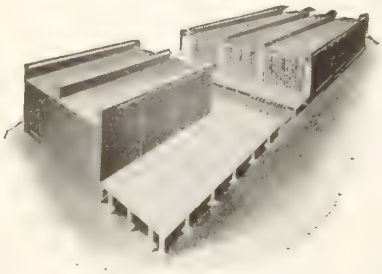

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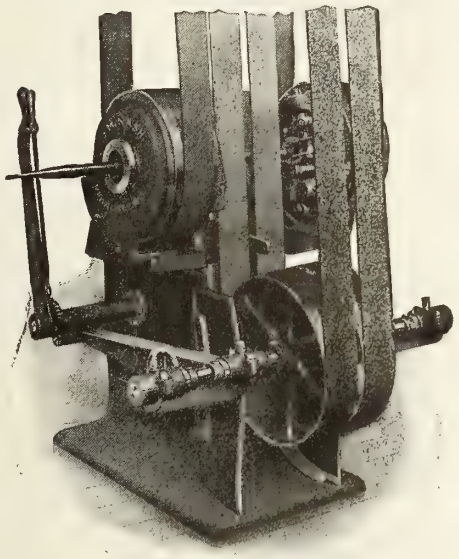

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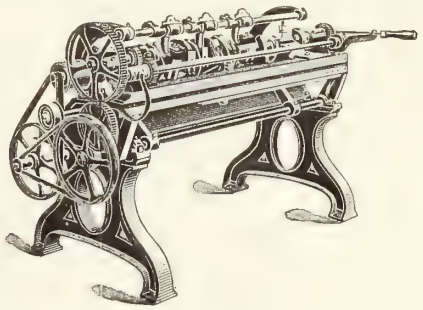

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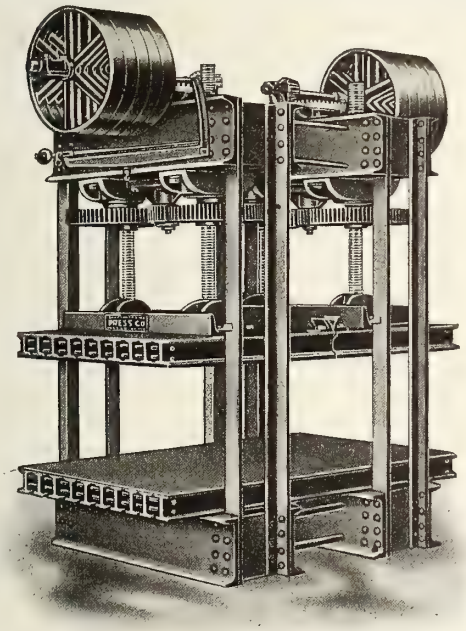

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Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

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Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Klotz Machine Company, Sandusky, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Whitney & Son, Baxter D., Winchendon, Mass.

MACHINE KNIVES
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MITRE MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MOULDINGS
Knechtel Bros., Limited, Southampton, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PAINTS & VARNISHES
Marietta Paint & Color Co., Marietta, Ohio.

PATENT SOLICITORS
Dennison, H. J. S., Toronto, Ont.
Lightfoot, Stanley, Toronto, Ont.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Shimer & Sons, Samuel J., Galt, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

PRESSES (Veneer)
Black Bros. Machinery Co., Mendota, Ill.
Jackson, Cochrane & Company, Berlin, Ont.
Perrin & Co., Wm. R., Toronto, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

RESAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

RIM AND FELLOE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Duplex Moulding Sander Co., Hornell, N.Y.
Elliot Woodworker Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SASH, DOOR & BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Shimer & Sons, Samuel J., Galt, Ont.

SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SAW GUARDS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Knechtel Bros., Limited, Southampton, Ont.
Pryibil Machine Company, P., New York.

SAW JOINTERS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SCRAPING MACHINES
Whitney & Sons, Baxter D., Winchendon, Mass.

SCROLL CHUCK MACHINES
Klotz Machine Company, Sandusky, Ohio.

SCREW DRIVING MACHINES
Reynolds Pattern & Machine Co., Moline, Ill.

SCREW DRIVING MACHINERY
Reynolds Pattern & Machine Works, Moline, Ill.

SCROLL SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.
Simonds Canada Saw Co., Montreal, P.Q.

SECOND-HAND MACHINERY
Pryibil Machine Company, P., New York.
Williams Machinery Co., A. R., Toronto, Ont.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pyribil Machine Co., P., New York.
Shawver Company, Springfield, O.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Invincible Blow-Pipe Company, Toronto, Ont.
Sheldons Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.

SPRAYING APPARATUS
De Vilbiss Mfg. Co., Toledo, Ohio.

STAINS
Marietta Paint & Color Co., Marietta, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass.

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Co., Chagrin Falls, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

TRUCKS
Standard Dry Kiln Co., Indianapolis, Ind.
Sheldons Limited, Galt, Ont.

TURNINGS
Knechtel Bros., Limited, Southampton, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Whitney & Sons, Baxter D., Winchendon, Mass.

UNDER-CUT SELF-FEEDING FACE PLANER
Fay & Egan C., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

VENEERS
Central Veneer Co., Huntington, W. Virginia.
Evansville Veneer Co., Evansville, Ind.
Hay & Company, Woodstock, Ont.
Hoffman Bros. Company, Fort Wayne, Ind
Huddleston-Marsh Lumber Co., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Robbins Veneer & Lumber Co., Buffalo, N. Y.
Waetjen & Co., Geo. L., Milwaukee, Wis.
Whisler, C. L., Hillsboro,' Ohio.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEERED PANELS
Hay & Company, Woodstock, Ont.

VENEER PRESSES (Hand and Power)
Canadian Boomer-Boschart Co., Montreal, Que.
Jackson, Cochrane & Company, Berlin, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD TURNING MACHINERY
Berlin Machine Works, Ltd., Beloit, Wis.
Shawver Co., Springfield, Ohio..

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Jackson, Cochrane & Co., Berlin, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

WOOD SCREWS
Robertson & Company, P. L., Milton, Ont.

WOOD SPECIALTIES
Knechtel Bros., Limited, Southampton, Ont.

WOODWORKING CUTTERS
Galt Knife Company, Galt, Ont.

YELLOW PINE
Prendergast Company, Cincinnati, Ohio.

KNECHTEL'S

LIGHTNING CUT-OFF SAW

A few of the special features of this machine:—

Semi-automatic feed which is easily controlled by the operator;
Self-oiling bearings in which the saw mandrill runs;
Adjustable saw-guard which can be instantly shortened when cutting narrow material;
Adjustable gauges to cut various angles up to 45 degrees;
Tight and loose pulleys, 8 inch diameter by 4½ inch face;
Twelve inch saw with 18 inch cut;
Strong substantial frame with the entire machine self-contained.

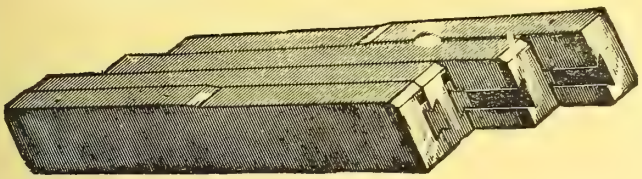
Write for prices and information.

KNECHTEL BROS.
LIMITED
SOUTHAMPTON, ONT.

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively.

Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

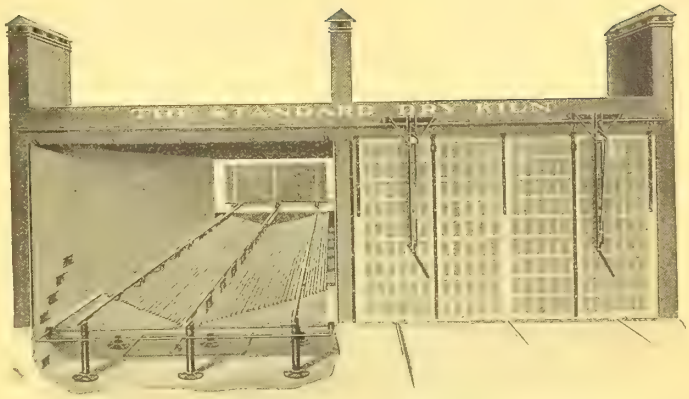
MADE BY

B. Walter & Company

Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887



Read the Letters

that users write, saying: "The Standard Dry Kiln is doing MORE than you claim." Then you'll begin to see why we can afford to make our guaranty as strong as we do.

Write for the catalog. In it you'll find letters like that from furniture factories and veneer mills where The Standard Moist Air Drying System has been "making good" year after year. Address: The Standard Dry Kiln Co., 1560 McCarty Street, Indianapolis, Ind.

The Things that Make Sanding Paper or Cloth

THE cutting ability and purity of the abrasive grain used—the grade of glue, the quality of the paper and cloth or backing, and the process of manufacture.

Carborundum Brand Garnet Paper and Cloth

are coated uniformly with clean, sharp, fast-cutting *Garnet* grains. The glue used is of the highest grade—the backing of the best possible quality—the process of manufacture the most approved—all of which results in the paper and cloth you should use for better, faster, more economical work.

Sample sheets upon request.

The Carborundum Company

Niagara Falls, N. Y.

New York Chicago Boston Cleveland Cincinnati Grand Rapids Milwaukee Philadelphia Manchester, Eng. Dusseldorf, Ger.

Marietta Quality Wood Finishes

If you put Marietta quality into the finish of your furniture, you will get a finished product that you can be proud of and that will sell.

Marietta Spartan Art Wood Stains

always live up to their reputation for reliability. They are always practical.

They are made in variety to meet every demand of the trade.

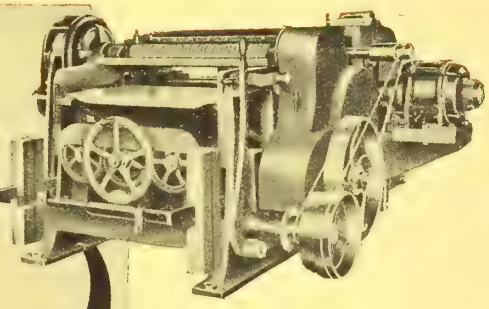
Write for sample panels.

The Marietta Paint & Color Co
Marietta, Ohio

Volume Fifteen TORONTO, OCTOBER, 1915 Number Ten

CANADIAN
WOODWORKER
and
Furniture Manufacturer

Whitney Motor-Driven Planers



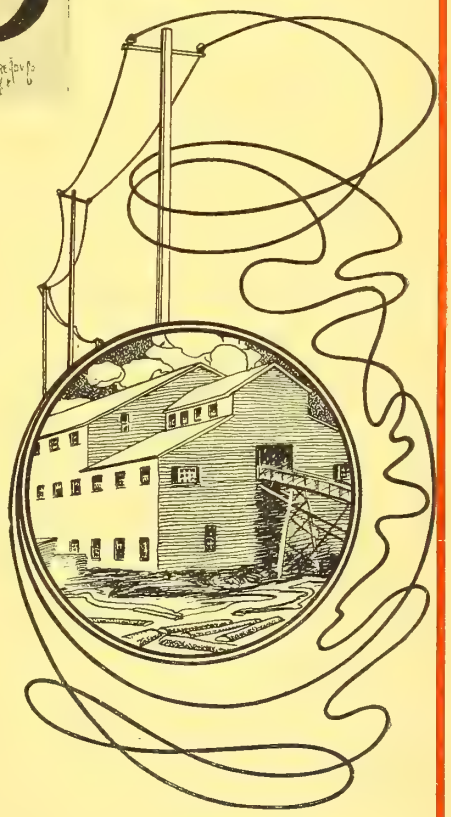
Save 25% on Power

Neither countershafts nor cylinder belts are required,—the motors are connected directly to the cylinders by special flexible couplings and the power delivered just where it is required without slipping of belts.

Aside from the saving of power, Whitney Motor-Driven Single and Double Surfacers eliminate the care and expense connected with loose pulleys, countershafts and belts.

No planers have received so close a scrutiny as to cost of operation and quality and quantity of surfacing produced,—as have these Whitney Motor-Driven Single and Double Surfacers. We're satisfied. The saving is yours.

Tell us the kind of planing you do. We can and will suggest the best possible equipment for your Motor-Driven or Belt-Driven Whitney Planer,—either square cylinders and two or four knives, or round cylinders and four thin high-speed steel knives, sectional rolls and steel sectional chip breakers or flexible steel chip breakers.



Baxter D. Whitney & Son, Winchendon, Mass.

California Office: Berkeley, California.
H. W. Petrie, Ltd., Toronto, Ontario, Agents for Ontario and Quebec

Selling Representatives: Henry Kelly & Co.
26 Pall Mall, Manchester, England

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"Crown" Planer Belting

Built for heavy service and short bends over small pulleys

More than perfect construction and special tanning has made "Crown" the leading planer belting. The careful selection of hides obtained at the proper season is the foundation of a good Belt.

The tanned leather is carefully selected and no weak spots are allowed to enter into the manufacture of our belts.

The surface of "Crown" planer belting grips the pulleys and prevents slipping. "Crown" belting will solve any high speed heavy duty problems.

We have been tanners and manufacturers since 1876.

"Leather, like gold, has no substitute."

WRITE US FOR PRICES

Made in Canada

Sadler & Haworth

Tanners and Manufacturers

Toronto	St. John, N.B.	MONTREAL	Winnipeg	Vancouver
38 Wellington St. E.	189 Prince William St.	511 William St.	Galt Building	217 Columbia Ave.

Shell Box Lumber

Dry Birch

WE have in stock approximately three (3) million feet of 4/4-8/4 and 12/4 Birch sawn during seasons of 1913-1914 and 1915. This is practically suitable for manufacturing or Boxing purposes as it was sawn partially square and partially round or live edged.

We have extensive Kiln Drying, Resawing and Dressing Plants and can work to order.

Dry Spruce Boards

We carry the largest and best assorted stock in Canada.

SEND US YOUR INQUIRIES.

John Fenderson & Co., Inc.

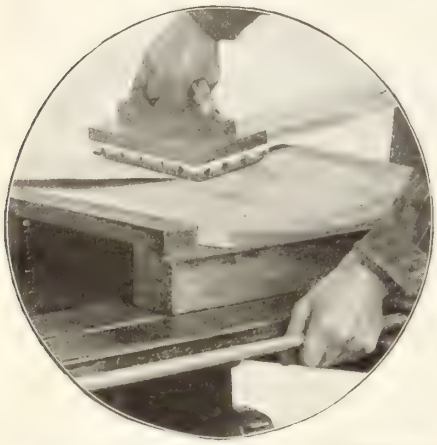
Sales Office:
Springfield, Mass.

Saw Mills, Storage Yards and Planing Mills:
Sayabec, Que.

A New Berlin Sander

that produces

Hand Finish with Machine Speed



Speeding up finishing operations on a curved surface

Large built-up work perfectly sanded by alternate use of coarse and of fine grit belts

THE modern Sanderman holds his block directly before him—over his work, bringing the sand efficiently to the work the same as he has always done. He has the same flexibility, enabling handling of work that no other type of sander can do. But the small capacity—the old expense, is entirely done away with by use of the new Berlin

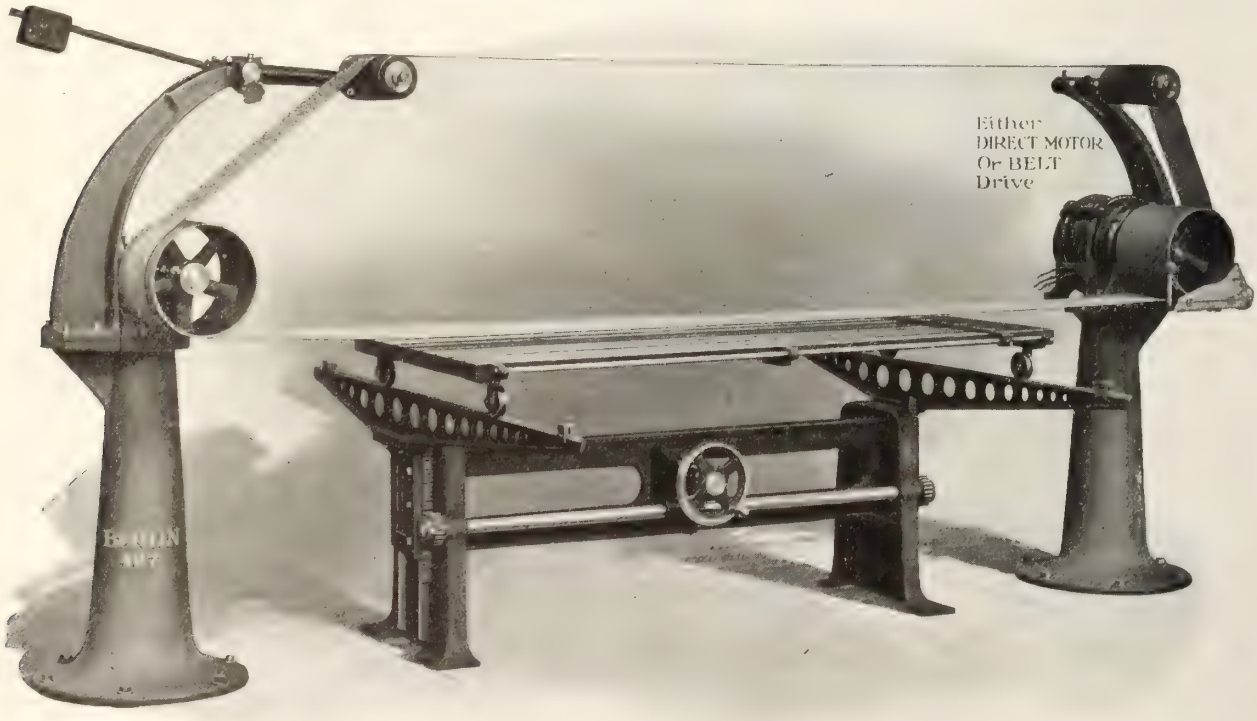
Hand Block Belt Sander

Operation is identical to that of hand sanding as the illustrations show—except that capacity is enormously multiplied by the sand passing over the work at mile-a-minute speed.

The range is so great as to take care of work of practically any size or shape. The flexibility of the machine furthermore makes practical the attachment or use of fixtures for supporting odd-shaped work so as to permit of as convenient belt contact as on flat work.

Send for protographs of such work being done on cabinet or mill work—they show how money is being saved. Tell us of such work as you are still finishing by hand or by some other slow, tedious and expensive method. In asking for Pamphlet "427" address the

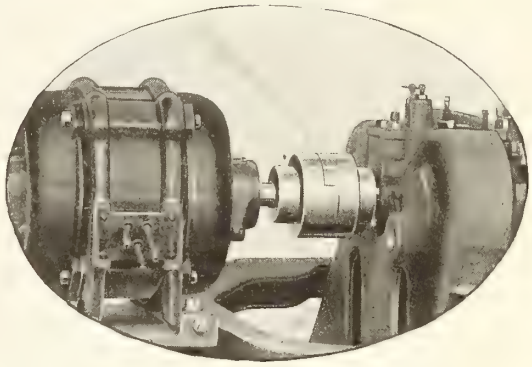
Berlin Machine Works, Ltd.
HAMILTON, ONTARIO

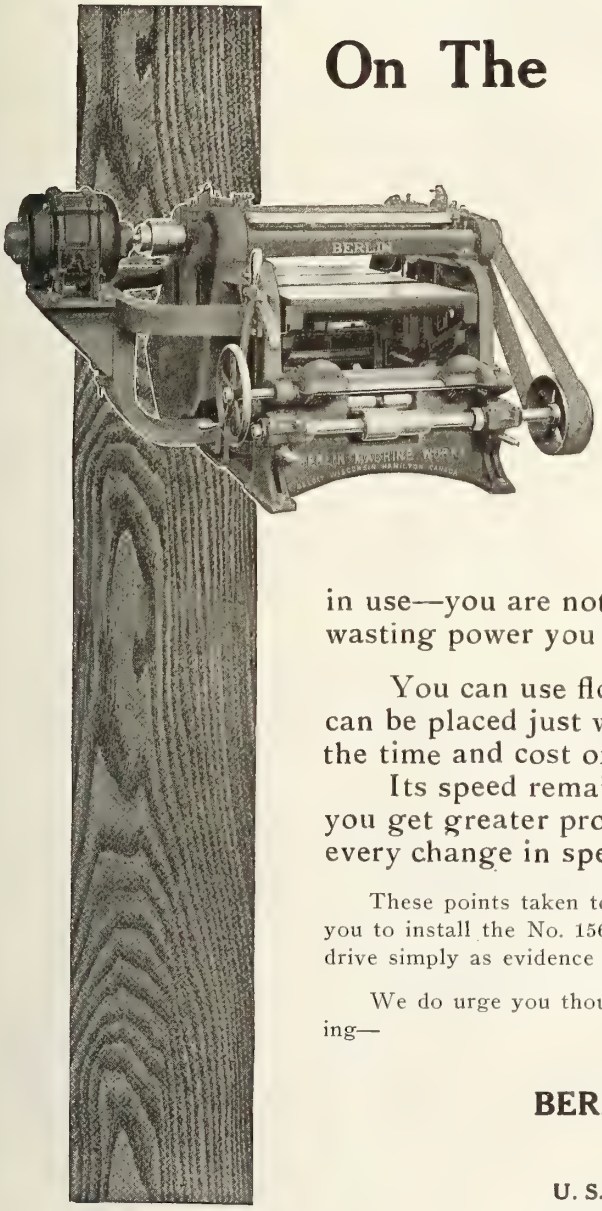


Send us samples of your work. Get our suggestions without expense.

THE COUPLING

Is Direct From Motor to Cylinder On The





Berlin Motor-Driven Surfacer

Bringing power and machine together, cutting out those wasteful middlemen—shafting and belting, so that you get a clear overhead, better light, greater operative safety, and diminished fire risk.

The machine consumes power only when in use—you are not spending money in turning idle shafting, thus wasting power you pay for.

You can use floor space to better advantage, as each machine can be placed just where you want it, so that you greatly reduce the time and cost of handling lumber.

Its speed remains constant as there is no belt slippage—so that you get greater production and a better quality of product, since every change in speed means a variation in your surface.

These points taken together earn greater profits for you. However, we don't urge you to install the No. 156 merely on the strength of one feature. We mention motor drive simply as evidence of Berlin Surfacer adaptability to modern demands.

We do urge you though to get the construction and performance details by writing—

BERLIN MACHINE WORKS, LTD.
Hamilton, Ont.
U. S. Plant and Executive Offices, Beloit, Wis.

MADE RIGHT—RIGHT IN CANADA

Berlin

Single or Double Surfacers for Every Purpose

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"ACME" Casters Outlast The Furniture

The choice of trimmings and casters may be a deciding factor in the classification of your furniture. Use "Acme" Ball-Bearing or Non Ball-Bearing Casters and you will be known as a maker of the best furniture.

"Acme" Casters usually outwear the furniture they carry. They never bend, loose their wheels or develop flat sided wheels.

We solicit your enquiries and will be pleased to have our Canadian representative call and discuss any special Casters or Period Trimming you may require.

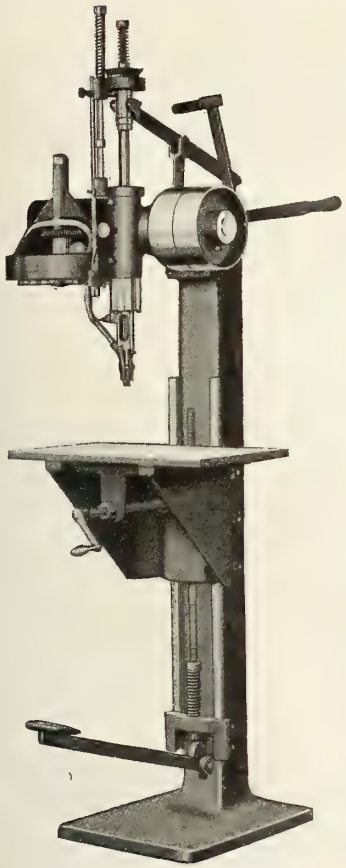
Foster, Merriam & Co.

Meriden, Conn.

***Canadian Representative:*—F. A. Schmidt, Berlin, Ont.**

"ACME"

For All Furniture



No. 2 Standard Type Automatic Screw-Driving Machine.

The Only Way to Drive Screws

There is a stage-coach method and a modern method of doing everything. When it comes to driving screws the only modern way is with an Automatic Screw Driving Machine, which means greater and better production and greater profit.

The Reynolds Automatic Screw-Driving Machine

is guaranteed to produce results. It is no experiment. The No. 2 Standard Type, shown herewith, is particularly suited for placing the screws in the straps of shrapnel boxes. It may be fitted to drive, without change or adjustment, any three consecutive sizes flat or round head, or two sizes filister head, No. 6 to 14 inclusive, wood or machine screws, or three sizes flat or round head, or two sizes filister head machine screws up to No. 20. All the above up to 1½ inches long if smaller than No. 10, or up to 1¾ inches long, No. 10 or larger. Fitted with boring attachment if desired.

Many Machines in Use in Canada.

Ask for our Catalogue.

REYNOLDS PATTERN & MACHINE CO.

101 and 103 Third Ave., Moline, Ill., U.S.A.

Perkins Vegetable Glue

The Best for Built-up Stock and Veneer Laying

Dinner wagon manufactured by the D. Hibner Furniture Co., Limited, Berlin, Ont., in which Perkins Glue was used.

Perkins Vegetable Glue sticks and holds. It is unaffected by dampness, extremely dry atmosphere or severe sanding. We guarantee to effect a 20 per cent. saving in your glue room by replacing hide glue with Perkins Vegetable Glue. Along with this saving you can have a glue room comfortable as to temperature and sweet as to smell. The glue is absolutely uniform in quality. Every shipment exactly the same. Let us demonstrate in your own factory and on your own stock just what can be accomplished with Perkins Vegetable Glue.

Perkins Glue Company, South Bend, Ind.

1913 Edition
"Practical Pattern Making"

A Practical Work on

The Art of Making Patterns, written by a pattern-maker with thirty years' experience. Contains information on Pattern Making and Pattern-Makers in general, also a detailed description of the necessary materials and how to use them. Then the tools, both hand tools and machine tools, with special chapters on the Lathes, the Band Saw and the Circular Saw, with many examples of work which may be done on these machines.

A complete section of illustrated examples of Pattern-Work in wood, with many pages of metal pattern-work, Gating and Plate work. Both Vibrator and Stripping Plates are shown. Specific instructions for plaster work are given, and finally, the cost, marking and record of patterns are explained and illustrated.

By F. W. BARROWS

Price $2.00

CANADIAN WOODWORKER
345 Adelaide St. West, TORONTO

WE HAVE BEEN MAKING THE

Best French Glue in the World

SINCE 1818; ALMOST A CENTURY

In competition at the numerous Expositions abroad, the quality of our glues has been found so high that we are usually declared "Beyond Competition." Our trade in this country makes the same declaration. Consistency in quality and service has brought this result and we are proud of it.

Perfection in manufacture from the best raw material makes the quality of COIGNET FRENCH GLUES consistently the highest.

Large stocks at Montreal assure the best of service.

Why not take advantage of these most important factors by using our glues?

At your service for prices and samples.

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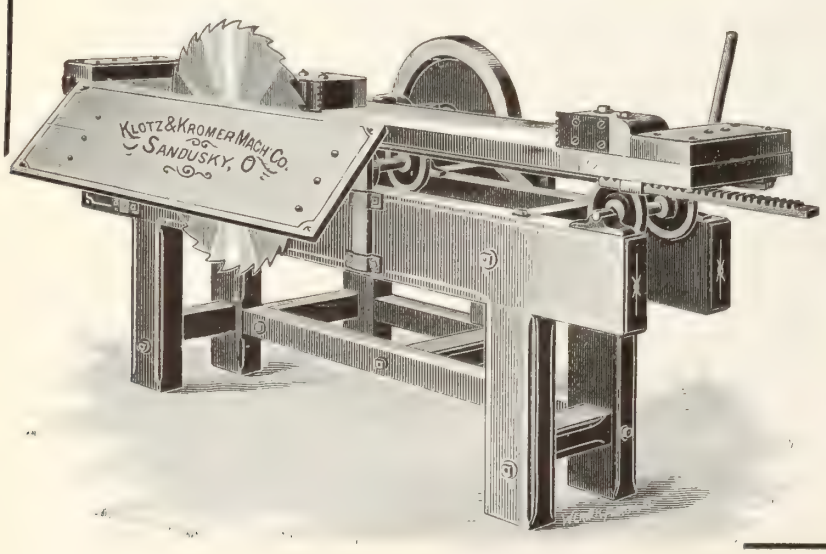

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Canadian Woodworker

A Monthly Publication in the Interest of the Woodworking Industry. Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.

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Manufacturing Opportunities

IT is an ill wind that blows nobody good. This is a somewhat trite but none the less true saying, and in no way is this assertion better exemplified than by the present war. To such an extent has the business of manufacturing industries been demoralized in the belligerent countries that in the short space of twelve months the whole fabric of industry has had to be remodelled, as it were. Certain lines in which Germany had practically a monopoly have been acquired from the most remote sources, while in the manufacture of the munitions of war the over-taxed factories of Great Britain, in spite of their supremacy, have had to yield much of the trade to Canada and the United States.

If we only knew it, the war has contributed greatly to the momentum of Canadian trade. Possibly the added impulse is equivalent to the normal growth of half a century. However this may be, certain it is that we are face to face with an unexampled opportunity of making a name for ourselves as an industrial as well as an agricultural country.

That the woodworking trades of Canada are having their share of opportunity is evidenced by many signs and tokens. In countless factories the most remarkable activity has ensued upon the receipt of important orders for shell boxes, and it is certain that with a continuation of the war a growing share of this business will continue to come to us. But a more important factor in the situation is the extent to which Great Britain is beginning to look to Canada for manufactured articles of general and even household utility. From Mr. MacMillan's special trade report, abstracted in this issue, and from the inquiries received, there would appear to be an excellent opening for Canadian manufactured goods in the British market. It must be remembered that in the Old Country there is a unanimous and final determination to cast off the commercial shackles which the present enemies of the Empire had begun to rivet. Now there is the strongest disposition to give every encouragement to trade with the colonies, and to cementing commercial relations with the allies of the Empire. In the reconstruction of things Canada, the most accessible—and the youngest and most aggressive—of the overseas dominions, should have a share, and an important share; but it is as well to bear in mind that the business cannot be acquired without enterprising effort—without the appointment of aggressive and well-informed men to open up territory—without publicity—without considerable initial expenditures. These things have to be faced in any new enterprise, and more so than ever in the case of doing business with another country.

We are all agreed that Germany has forfeited her claim to decent regard, and that as far as this day and generation are concerned she is ostracized. Why not, then, profit by what she has taught us in the way of adaptability and commercial enterprise? Surely this is the least return we can get for our great expenditures in life and property.

The great thing Germany taught us by leaping from commercial obscurity into commercial supremacy in the course of a decade or so was that adaptability is the keynote of success in the extension of commerce. Be it remembered that Germany's success came not only as a result of the manner in which she adapted her goods, prices, and terms of payment to the needs of the market, but especially by the manner in which she distributed men broadcast in the factories and commercial houses.

As a single instance, take the case of Italy: twenty years ago Germany held a modest position among the nations exporting to that country, while in 1913 she had attained absolute pre-eminence, with a total value of goods sold of 600 million lire (120 million dollars), leaving the United Kingdom behind with a total of only 590 million lire (118 million dollars). Now, of course, the Italians are anxious to give Great Britain as much as possible of the trade done hitherto by Germany, but it is feared that British manufacturers and exporters do not know how to take advantage of their opportunity. It is pointed out even in the Italian press that if England wants to meet German competition in England she must send men—men—and more men—to carry out her policy of commercial penetration; that she should replace her system of weights and measures by the metric system—at any rate, as far as catalogues for Italy are concerned; and that the mode of payment generally insisted upon should be modified, easy credit terms having always been conceded by Germany.

The illustration of the case between Great Britain and Italy should be suggestive to the Canadian manufacturer. There can be no doubt that there is a considerable market in Great Britain for Canadian goods, and although it is obvious that the conduct of trade

at the present time is somewhat difficult, there is every reason why we should take enterprising steps to ascertain how far it is possible to obtain our share of Old Country business.

Under the heading "Great Britain Asking for Canadian Manufactures," we extract in this issue considerable information contained in a report by Mr. H. R. MacMillan, Special Trade Commissioner at London, England. The details generally make interesting reading, but as we point out in our introduction to this feature, the section relating to pianos calls for particular attention. In the fiscal year 1913-14 the German importation of pianos to the British Isles represented the figure of $3,500,000. With this trade suddenly cut off, and the demand increasing, small wonder is it that inquiries for pianos are now being sent out wholesale. A noteworthy thing is that in nearly all cases the inquiries are for cheap grade pianos. Here we have the necessity of adaptation. The pianos are generally for the artisan class, and they cannot afford to buy instruments which retail at from $250 to $375. Generally they will buy an instrument at from $100 to $150. In the catalogue we find that for $140 (retail cash price) one should buy a piano 4 ft. 2 ins. high, in rosewood, walnut, or ebonized case, with three-panel moulded front and art sconces, reinforced iron frame, full trichord stringing, high-grade check repeater action, hammers with riveted felts, bushed keys, and brass pedal feet. The requirements are stiff for the price, but it is not sufficient for this reason to dismiss the whole idea of getting the business. Rather would it be better for a combination of manufacturing interests to get together and appoint special representatives to proceed to Great Britain and look into the details of manufacture, delivery, cost, terms, representation, and so on. In such ways only in the various fields of manufacturing activity may Canada rise to the present opportunity.

In the affairs of nations, as in the affairs of men, there is a tide which, taken at the flood, leads on to fortune. To neglect to take the tide may not mean that Canada as a nation will be bound in shallows and in miseries for all time to come, but it will mean that she will forfeit her claim to recognition as a manufacturing country, and have to rely upon the sale of agricultural products.

Great Britain Asking for Canadian Manufactures

INFORMATION of interest to Canadian manufacturers who may be looking to Great Britain as a source of increased trade is furnished in a recent report to the Department of Trade and Commerce by Mr. H. R. MacMillan, Special Trade Commissioner at London. Among the following extracts the section relating to pianos calls for attention in view of the number of enquiries relating to the Canadian trade received of late. The more recent of these enquiries, together with others relating to the field in general, are given at the end of the article.

Not nearly so much wood is used in the interior trim of buildings in Great Britain as in Canada. The use of plaster, wallpaper and other substitutes is much more general. The floors are covered with linoleum or carpet. The use of wood is restricted to doors and windows with their casings, to floors which are for the greater part covered, to basebords and to stairways.

Such wood as is used may be divided into two broad classes—the very cheap which is heavily covered with paint, and the very good which is given a natural finish.

The very cheap is overwhelmingly the more important of the two and is used in all buildings excepting the best class private dwellings, public buildings and a small proportion of offices.

Price of Doors in Use

The doors are imported manufactured. The cheapest doors for workmen's houses cost 76 cents each c.i.f. London. A size very much used, 2 ft. 6 ins. by 6 ft. 6 ins. by 1½ ins., moulded both sides, costs $1 each c.i.f. A half glass door costs $1.24. The great majority of doors are comprised of the above classes. A better class pine door is imported chiefly from the United States at $1.50 to $1.75 each.

In certain parts of the country, e.g., Dublin and the Scotch cities, the labor unions will not allow the importation of ready manufactured doors. Elsewhere the doors are all imported in stock patterns at prices ranging between those quoted. The doors come chiefly from Sweden, Canada and the United States and are made of very low grade timber, little better than pine box lumber. The doors imported at $1.50 to $1.75 are not nearly as good as the fir veneer doors selling wholesale for the same price in Canada. The purchasers of the doors, which are imported ready-made, do not demand a good door. They want a cheap door, that will look fairly well when painted. The doors used for the best class of buildings are all manufactured locally from oak, mahogany or other high grade hardwoods, both solid and veneered.

The Grade of Flooring Used

The floorings used in nearly all buildings are sound but very knotty. Both spruce and redwood are used. Large quantities are imported from Norway and Sweden ready manufactured, and the remainder is dressed in Great Britain from imported lumber. The sizes are ⅞-in. by 5½-in.- 6-in.; 1-in. by 5-in.- 5½-in.- 6-in.-7-in. and 9-in.; and 1⅛-in. by 4-in.-6½-in., and the sizes most commonly used are the 5-in. to 7-in. widths. Most of the flooring is dressed both sides and both edges and is square-edged. The quantity of tongued and grooved flooring used is not great. All flooring imported is flat-grained.

Samples of Swedish flooring which are being sent to the Commissioner of Commerce illustrate the grade used.

Mouldings, Ceilings, Linings and Baseboards

The mouldings, ceilings, linings, baseboards and other specially manufactured finish is not imported in the manufactured form, but is manufactured to order in the various woodworking establishments chiefly from Swedish redwood. The patterns vary throughout the country. The linings and ceilings or "matchwood," as they are called in England, are manu-

factured from lumber imported at $20 to $25 per thousand. Ordinarily the finished article is very well manufactured but full of knots. Common sizes are 6-in. by 9/16-in., ⅝-in., ⅞-in. or 1⅛-in., double V-jointed. Other sizes are used which vary throughout the country. The prices at which this lining is sold to builders is given below:—

⅝-in. x 6-in.	36 cents
⅞-in. x 6-in.	48 cents
1⅛-in. x 6-in.	60 cents

Pitch-pine floorings are used in public buildings. Imported sizes are 1¼-in. by 6-in., 7-in., 8-in., cost about $67 c.i.f. for rough clears. The 1¼-in. by 7-in.-8-in. is cut and dressed to 1⅛-in. by 3-in. matched.

In halls and public buildings 3-in. by 3-in. pitch-pine blocks are used, 2-ft. or more in length, sawn edge-grained. The normal price is about $28.80 to $33 per thousand feet.

Mahogany, Oak and Teak

Various species of mahogany, oak, teak and other hardwoods, which are comparatively cheap, and of which large stocks are carried in Great Britain, are used for finishing the best class of buildings. Mahogany sells for from one shilling to six shillings per cubic foot, depending on the variety, and is used in very large quantities.

Probable Market for Douglas Fir

The wide Douglas fir clears imported during the past two or three years have been used to a certain extent for interior finish. As the builders and architects become more familiar with the use of fir finish they will use it in large quantities. The chief sale will be in clear boards and planks for floors, inside joinery such as staircases and panels. The growth of the trade may be expected to be slow. Three-ply fir veneer is adapted for the uses as panels, for which wide clears are purchased, and if put on the market, should gradually develop a sale.

Pianos in Demand

Since the outbreak of war, imports of pianos from Germany have naturally ceased, and makers are finding it impossible to execute all orders received. Furthermore, the majority of the working classes are earning double their income of normal times and are consequently spending more freely. The pianos in demand among the artizan classes range in prices from $100 to $200, and if Canadian manufacturers can produce at these figures there should be no difficulty in procuring orders. Some little prejudice may be encountered at the outset, as is usually the case when unknown articles are being introduced to a new market; but there is no reason why Canadian pianos should not ultimately enjoy as favorable a reputation as Canadian organs.

Imports of pianos in normal times are valued at nearly $4,000,000. The countries of origin and values during the fiscal year 1913-14 were:—

Germany	£700,236
Netherlands	1,535
Belgium	9,842
France	21,424
Other foreign countries	23,490
Total from foreign countries	£756,527
Total from British possessions	£363
Total	£756,890

Trade Inquiries

The following inquiries relating to Canadian trade have been received by the Department of Trade and Commerce at Ottawa. Those especially interested in the respective commodities can obtain the names and addresses of inquirers by writing to the Inquiries Branch of the Governmental Department mentioned above, by communicating with the Secretary of the Canadian Manufacturers' Association, Toronto, or by getting in touch with the Secretary of the Board of Trade at London, Toronto, Hamilton, Kingston, Halifax, Montreal, St. John, Sherbrooke, Vancouver, Victoria, Winnipeg, Brandon, Edmonton, Calgary, Saskatoon, Chambre de Commerce de Montreal, and Moncton, N.B.

1035. **Agricultural implements, tools, hardware, etc., etc.**—An English firm inquires for manufacturers of the following articles: agricultural implements, hand-tools, hardware (bolts and nuts, screws, nails, fencing, belting, grindstones, rope and twine), wood goods (all kinds of domestic articles, dowels, wood-handles, skewers, etc.), wrought-iron tubes and mild steel in bars and sheets.

1038. **Bentwood bands for trunks.**—A Liverpool firm desires the addresses of Canadian manufacturers who can furnish bentwood for bands for trunks.

1043. **Pianos.**—A firm in Birmingham is open to purchase the cheaper grades of pianos. Full particulars should be forwarded and quotations must be c.i.f. Liverpool.

1046. **Wooden goods.**—A Birmingham commission agent is open to represent manufacturers of all kinds of small wooden goods, particularly handles.

1048. **Pianos and Organs.**—A firm in England is open to consider catalogues and quotations from manufacturers of pianos and organs.

1052. **Pianos and organs.**—A firm in England inquires for catalogues and prices of all grades of pianos and organs. Quotations delivered Liverpool.

1054. **Pianos.**—A British firm inquires for catalogues and prices of pianos. Quotations delivered Birmingham, Eng.

1060. **Wood goods.**—A London company interested in all branches of the wood trade, as brokers or agents in sawn wood, pulp-wood, props, telegraph poles, bentwood furniture, spokes and wheels, spoolwood, silver spruce, sawn or planed hardwoods, or as merchant buyers on their own account in boxboards, plywood, match splints, dowels, broom handles, and squares for making broom handles, is prepared to act for Canadian manufacturers and shippers. Quotations c.i.f. United Kingdom essential.

1068. **Bentwood chairs.**—A Midlands firm asks to be placed in touch with Canadian manufacturers of bentwood chairs.

1073. **Hardware and wood handles.**—An English firm is open to purchase all kinds of hardware on a cash basis. Catalogues should be sent and prices must be delivered Birmingham. They also desire to get into communication with Canadian exporters of wood handles.

1074. **Household utensils, ironmongery, wooden handles.**—A British firm would like to hear from manufacturers of the following articles: all kinds for domestic use made of wood, tin or iron; mechanics hand tools; wire nails; nuts and bolts; wooden handles. Prices should be delivered Birmingham.

1076. **Pianos.**—A Birmingham firm is open to consider catalogues and prices of pianos of cheap grade particularly Prices must be delivered Leicester.

1077. **Pianos.**—A British firm inquires for lists and quotations of Canadian pianoforte manufacturers making a specialty of models for the English market.

1078. **Pianos.**—A firm in England already importing Can-

adian higher grade pianos is open to purchase a cheaper grade in addition, which would sell at about $100. Prices should be delivered Liverpool.

1079. **Pianos.**—An English firm is open to represent a Canadian manufacturer of cheap grade pianofortes.

1080. **Pianos.**—A British firm would like to hear from Canadian firms who could supply two pianos weekly of the cheapest grade possible.

1081. **Ironmongery, wooden handles.**—A firm in England inquires for all kinds of tools, wire nails, nuts and bolts, wire netting, etc. They are also in a position to purchase large quantities of miners' pick handles, manure forks, hay forks, etc. Prices must include delivery at Chesterfield.

1088. **Webbing.**—An English firm is open to purchase webbing for chair bottoms. Prices delivered Liverpool. (Sample can be seen at Department of Trade and Commerce, Ottawa.)

A Word in Season

THE false economy of attempting to save money by retrenching in the amount of publicity given to manufactured lines is suggested in the following letter received by The Canadian Woodworker from the Imperial Rattan Company, Stratford, Ont.:

> We are interested in up-to-date machinery, but we feel that manufacturers are rather "chilly" in placing it before the public.
>
> We run a continuous advertisement in the only two trade papers in the furniture lines published in Canada—as a matter of general principle. No dealer worth while can say he does not know where to get our wares. This is more than one can say regarding certain machines we require. We are looking for information about Screw Driving Machines, and only in your last issue has one been advertised.
>
> We take the American and English magazines in similar lines, but there is room for a publication such as yours. Those who have wares to sell should advertise, so as to bring them to our attention.
>
> Yours truly,
> Imperial Rattan Company, Limited,
> per H. W. Strudley.

Manufacturers of the lines in which woodworkers are interested must maintain and promote the interest of the men who use their products; otherwise they will find a continually decreasing use of their goods in the factories. They must realize that the day has passed when the advertising pages were considered dull. To-day they are made as lively and as interesting as they can be made. Each page carries a different message to the reader, and each month sees something new submitted for his approval.

There is not only optimism in advertising—as pointed out in our last issue—but there is the whole substance of business vitality in it. Sane economy must be practised during the war, but certain it is that manufactured lines that are deprived of publicity during the war will be swallowed up in the maelstrom of greater competition after the war.

The argument that it is cheaper to pay the price and get a good veneer machine rather than an inferior one at lower first cost, also holds good when it comes to buying knives, and perhaps the good should be emphasized, because the knife is the business end of a veneer machine.

How to Guard Against Sander Accidents

AT first it would seem out of place to write about the "danger" of a safe machine: roll-feed and endless-bed sanders are decidedly safe in every particular; but it is just this safeness that causes the few minor accidents that happen—first, because operators are apt to become so careless in time as to disregard all personal precaution, and second, because it is so hard to tell how accidents can happen at all, until they do, that operators do not know what to guard against. To overcome these accidents altogether it is necessary for operators to guard against themselves by keeping their attention fixed on their work. By calling attention to the usual forms which their thoughtlessness takes, operators may know what to look for.

On the surface, one class of work would seem as safe to sand as another, but this is not the case. The form of stock determines this, as some work is so constructed—frames for instance—that the operator closes his hand over the back edge of the piece while feeding. If his mind is not on the work, the rolls will quickly draw the stock into the machine and the operator's hand will be crushed between the front of the infeeding plate and the inside of the rear end of the frame as it advances past the front of the plate.

One of the most common faults is for the boy at the back to let his fingers rest over the outfeed bed plate, and while he is talking and looking around waiting for stock to feed through to him, a piece will come along before he knows it and nip off his fingers between the end of the bed plate and the end of the stock.

The most obvious thing, on the endless-bed type of sander, is not to get the fingers between the slats before they close. While this is very awkward and hard to do, some men will find it just possible to do and suffer for their curiosity. An operator may catch a finger or two if he lets them hang too far over the edge of stock.

On this machine men will reach under the revolving bed time after time to oil it while it is running. They are not often caught, but once is enough. It pays to play safe. A sleeve is liable to get caught as the slats come together just under the machine, and it is not only the shirt that is torn.

When a man is running stock on the roll-feed sander he goes by the pressure roll to see how much pressure he has got. Nearly all operators do this. It is not dangerous except when they become careless. But men become careless so often that this is the most frequent cause of accidents. A man will take hold of the roll with one hand and try to stop it. He tries to do this too quickly, and this requires a pretty firm grasp, so that the hand has to be at about right angles from the arm. In this way one finger or so is liable to get over too far and to be pulled under the paper, and the finish is not very satisfactory. This is a trick for operators only, but it looks so easy that other men are apt to try it, with the result that their hands are usually severely sanded. The point is not to get the hand past the top of the roll. A man cannot get caught then if his mind is on his work.

About the same thing happens to the boy who sees a little dirt or chip clinging to the last out-feed roll and in brushing it off lets his hand be carried over too far. Before he knows it his fingers have been ground off, because it is impossible to stop these rolls until the power has been shut off. The boy could

and should use a brush to keep the out-feed end of the machine clean.

Operators need never get into difficulty if they will only bear these points in mind and remember that close attention is the best guarantee of their own interest.

The Right Tone

AN interesting article—evidently inspired, but containing some sound common sense at that—appeared in a recent issue of the Peterborough Examiner. In this article it is pointed out that furniture was never so cheap as it is today, and that manufacturers are willing to sell their goods at the minimum of profit so as to keep their factories going and their organizations together.

Certainly this is an advantageous time to buy furniture. In buying now the public have the additional satisfaction of knowing that they are helping to sustain a great industry, that they are giving work to tens of thousands of people, and that they are putting money into circulation.

Publicity of this kind is the right stuff. We should like to see more of it.

Toronto Man's Success at the Canadian National Exhibition

MR. Robert Ferguson, known to many of our readers as the author of a number of interesting articles which have appeared in The Canadian Woodworker, met with gratifying success at the Canadian National Exhibition. With three exhibits he obtained two first prizes and one second. The accompanying photograph of the successful woodwork was taken in the office of this journal.

One first prize was awarded Mr. Ferguson for a collapsible bed-tray, in a competition for "any useful household article in wood." This tray is made of American walnut, inlaid with a well-executed shell design in the centre, with a string surround. The legs are hinged, and are held in position by a thin strip of walnut, which passes through a block in the centre screwed to the under part of the tray.

Another first prize was for "any article in inlaid wood-work." This was for an attractive model of a grandfather clock. This exhibit is executed in mahogany, inlaid with tulip and boxwood banding.

A second prize was awarded Mr. Ferguson for a spinning chair entered in the competition for "relief carved chairs." The chair shown is made of solid mahogany. Around the seat is a one and one-half inch carved band, while the back, which is detachable, is ornamented by a carved floral design surmounted by a figure-head.

The successful competitor is Foreman Mechanic at the Royal Ontario Museum. A native of Stirling, in Scotland, he was apprenticed for five years to Messrs. Graham & Morton, house furnishers, with whom he had every opportunity of acquiring an intimate knowledge of every branch of the furniture manufacturing industry. Upon the completion of his apprenticeship he remained with the firm for three years as a journeyman.

Mr. Ferguson came to Canada in 1910, and made connections with the Canada Show Case Company, with whom he remained for about twelve months. He has put in two sessions as Instructor of Woodwork at the Central Technical School. For four and one-half years now he has had charge of the cabinet work at the Royal Ontario Museum. It this department, as in the others at the Museum, the work is of an entirely educational character. Readers of The Canadian Woodworker are invited to get in touch with Mr. Ferguson through the medium of this journal. They will have an opportunity of looking into Period and other designs which will be found at once interesting and suggestive.

Mr. Robert Ferguson.

Mr. Robert Ferguson's prize-winning exhibits at the Canadian National Exhibition.

A Toronto Lumber Firm with a Well-Equipped Planing Mill Plant

SOME twenty-three years ago, the Boake Manufacturing Company, now one of the most successful and aggressive retail lumber firms in the city of Toronto, commenced operations in a very modest way, near Dartnell Avenue, Toronto, on the north side of the tracks of the Canadian Pacific Railway. Their building, yards and the whole outfit occupied a space of about one-half acre of land. The company was started by Mr. W. F. Boake and his son, Mr. G. Wilfrid Boake, the latter being manager, a position which he has continued to occupy up to the present. From this comparatively small beginning the company, under Mr. G. W. Boake's direction, quickly increased its volume of business, and in 1902 it was found advisable to take out letters of incorporation. Shortly after this, on December 27, 1902, the company suffered a practically total loss by fire, the only thing left of their plant and stock being the rough lumber in the yard. Preparations were immediately made for resuming operations. The plant was rebuilt and soon the company was doing a larger business than ever.

In 1905 the arrival of the Niagara Power Company made it necessary for the company to vacate its property. Inconvenient as such a change was, it happened to be the turning point in the company's business operations. Finding it necessary to move Mr. Boake enquired into the possibility of increasing the company's accommodation, with the result that, after the Niagara Power Company had bought them out from their old site, they acquired a new one, which afforded them ample opportunity for growth. The location of the new site practically adjoins the old one, being a little to the east and north of the latter, and covering in all about six acres, which the firm succeeded in acquiring from time to time in four different adjoining parcels. The company's operations have been continued on this site up to the present day. Their yard and offices are now bounded by Kendall Avenue on the east, Davenport Road on the north, Dartnell Avenue on the west, and the C. P. R. tracks on the south.

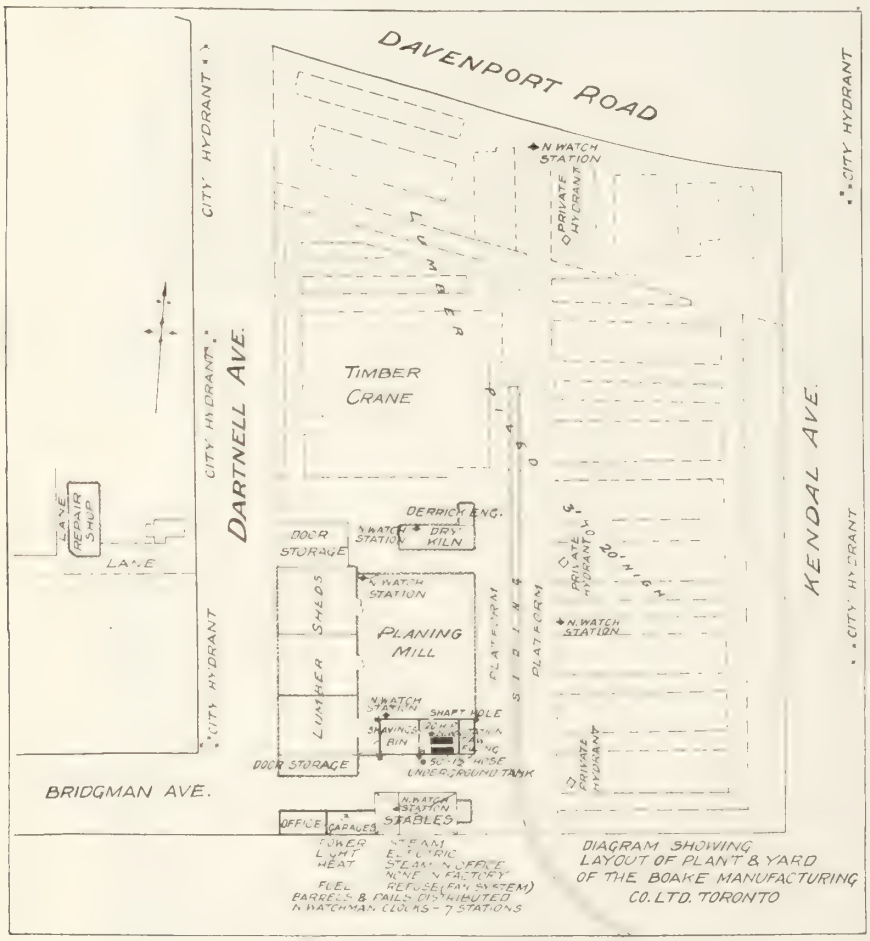


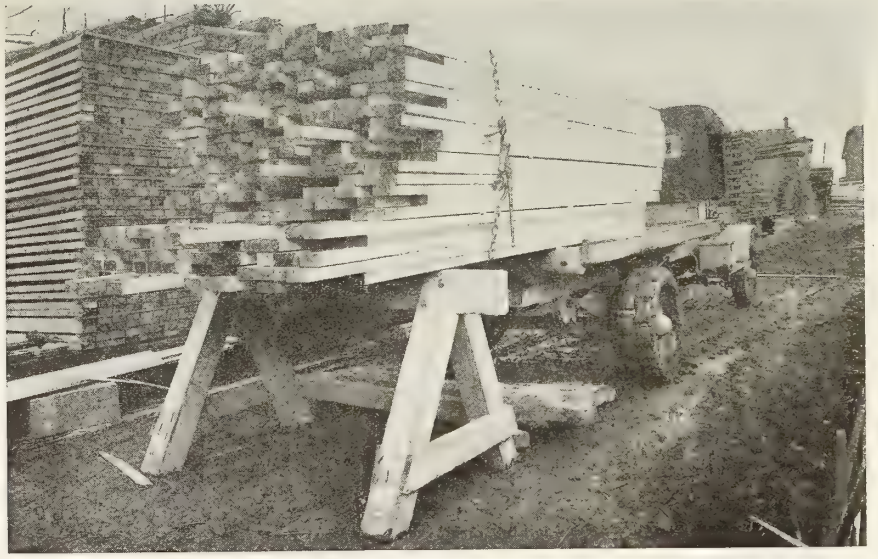
Diagram showing lay-out of Boake Manufacturing Company's yard and plant.

In addition to dealing in an extensive variety of lumber and timber the Boake Manufacturing Company carry a large planing mill business. The planing mill plant is located, as will be seen from the accompanying plan, near the southwest corner of their property and is placed in such a way as to offer the greatest possible facility for quick and efficient operation. Surrounding the planing mill on the north and east are the stocks of lumber and timber in the yard. A C. P. R. siding runs north through the yard with stocks of lumber and timber to the east of the track and planing mill, timber hoisting crane and other stocks to the west. Stock can thus be moved from the yard to the planing mill with the least possible amount of effort and loss of time. From the planing mill it is moved to the lumber sheds which adjoin it on the west, as will also be seen by consulting the plan.

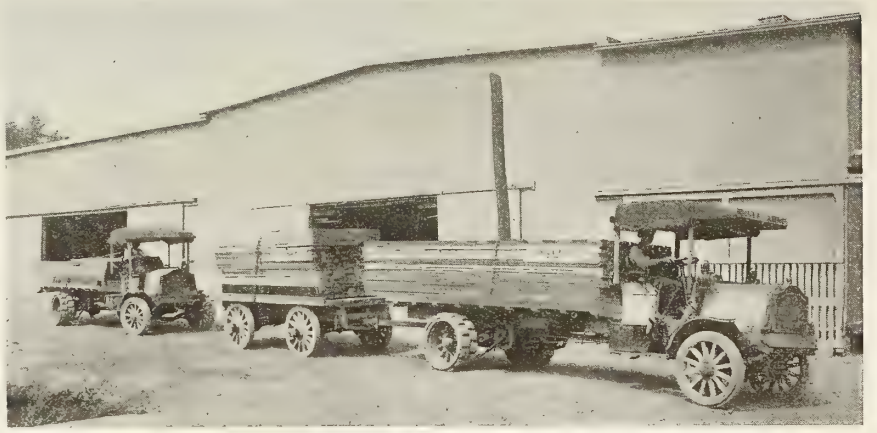
The planing mill is about 135 feet wide and 166 feet long. The lumber sheds which adjoin it are 64 ft. long x 210 ft. wide, divided into five sheds. The stock from the machines feeds directly from the mill into these sheds, which have a storage capacity for about 1,000,000 feet of dressed lumber and 7,000 doors. Driveways run through the centres of the sheds providing good facilities for loading and shipping stock.

The office is located in the southwest corner of the company's property and is a two-storey building with ample accommodation for the extensive staff employed. Adjoining the office are three garages where the company's motors are kept.

In order to facilitate the handling and sorting of stock in the yard the railroad siding is depressed so that the platform of an ordinary flat car is on a level with the ground of the yard. This makes the unloading of the railroad cars a very simple operation. For the movement of stock about the yard and through the planing mill the company have 67 two-wheel lumber buggies which enable them with much ease to sort the different sizes and grades of stock as soon as they are received.



Up-to-date delivery. Loading trucks.



An order of dimension timber leaving the yards.

Modern facilities for timber dressing.

Up-to-date delivery. Unloading at the job.

THE BOAKE MANUFACTURING COMPANY'S PLANT, TORONTO.

A very interesting and important part of the equipment in the yard is shown in one of the accompanying illustrations, in the form of a large timber crane. In the early days of the company's history it was found that the moving of heavy timbers was an extremely difficult and expensive operation when carried out simply by human power. Mr. G. W. Boake investigated the possibility of installing a crane for this work and after considerable travel and search was successful in finding exactly the class of crane that he required. As will be seen from the illustration, the crane is of the derrick type. It will raise a load of six tons. This may be taken from the railroad cars upon the siding and placed in their proper piles in the yard. The crane is also used for transferring stock from the piles to the small lumber buggies upon which it is moved to the planing mill. If rough timber is being delivered from the yard the crane can make the loading direct upon the delivery wagons or motor trucks. It is operated by a three-drum twin cylinder, steam hoisting engine. The man who adjusts the tackle in the yard signals by means of an electric annunciator to the engineer who operates the crane. At the time the accompanying photograph was made the crane was hoisting three large timbers from a railroad car to one of the piles in the yard.

Timber-handling crane at Boake Manufacturing Company's yard, Toronto.

Another interesting bit of equipment in the yard is the timber boring machine which will bore a hole lengthwise through a stick of timber up to 24 feet long. The hole can be made of any diameter from ½ in. up to 4 ins. The boring machine is driven by an individual 20 h.p. motor.

The Boake Manufacturing Company carry in stock at all times a large variety of lumber, both plain and dressed. Their stock includes hemlock lumber, joisting and timber; red pine lumber, scantling, joisting and timber; Douglas fir timber up to 14 ins. x 20 ins. x 40 ft., Georgia pine finish joisting and timber. In dressed lumber they carry such stocks as white and Georgia pine stock trim; stock finish in oak, ash and birch, ⅜ in. and ⅞ in. plain and quarter cut oak, maple and birch, end-matched flooring, stair stuff and verandah stuff, including all kinds of built columns. In doors, the company carry a wide variety of stock doors in oak, ash, fir, birch and white pine and they are also equipped to furnish doors of any description to architects' details.

A little to the north of the planing mill is located the dry kiln, which was furnished by the American Blower Company, of Detroit. This kiln has a capacity of 40,000 feet of lumber.

The equipment in the planing mill enables the company to turn out a wide variety of building material and to keep on hand a sufficient amount of such material to meet the current demand. This equipment includes a planer and matcher made by the American Wood Working Machinery Company, of Rochester, N. Y.; one fast feed planer and matcher made by the Berlin Machine Works Limited, of Hamilton, Ont.; one band resaw made by Connell & Dengler, of Rochester, N. Y.; two self feed rip saws; one 10-in., one 12-in. and one 14-in. four-sided outside moulder. The self feed rip saw and the three moulders were furnished by Cowan & Company, of Galt, Ont. In addition to the above machinery the equipment includes one cut-off saw and one timber sider which will dress four sides of timber up to 17½ in. x 24 in., of any length.

For the transportation of heavy timbers in the planing mill, the building is equipped with overhead cranes, making it easy to handle these large pieces of stock. These cranes are located so as to serve for handling stock to the planer and the resaw. There is also a crane for taking the dressed timber from the planer and loading it on to wagons or motor trucks for delivery at the jobs.

The experience which the company passed through in connection with its fire loss resulted in the utmost care being taken to prevent a repetition of such a disaster. Throughout the yard and plant there are now located seven night watch stations and three private hydrants, which are all indicated upon the plan. The plan also shows that the yard is well protected by five city hydrants located on its eastern and western boundaries. Throughout the yard and the buildings the company have installed an up-to-date sprinkler system. By means of all these precautions against the outbreak of fire they have been able to reduce their flat insurance rate from $4.65 per hundred dollars to $1 per hundred.

The facilities which the company has for delivering stock upon jobs in Toronto and its surrounding district are extremely efficient. They consist in the first place of two 3-ton Packard motor trucks. One of these is now running in its fourth season and the other in its third season. Last year the company added to this equipment a trailer, the operation of which is shown in one of the accompanying illustrations. In addition to its motor trucks the company has a splendid outfit of horses and wagons. A little to the west of Brunswick Avenue, a few yards away, the company has its repair shop for work upon the motor trucks, wagons, etc. This shop is equipped for up-to-date work of this kind, including repairs. Upstairs, above the repair shop, is located the paint shop. The building is two storeys, 25 ft. x 60 ft., and is fitted with a Fensom elevator for raising and lowering the wagons to and from the paint shop.

Velocity and Balancing of Revolving Cutters

THE grinding, fixing, and balancing of revolving cutters may be designated one of the fine arts in woodworking. Much diverse opinion exists, even amongst operators, in connection with what is really the correct angles to adopt, the proper limit of projection, and the safe extreme of pressure which may be exerted on revolving irons while being fixed on the head. Dealing with the first feature, viz., grinding, various methods are in current practice, says a writer in The Machine Woodworker. Some men prefer to make and grind all their cutters on sand stone wheels of varied thicknesses, from 2 in. to ¼ in. These are run (six or seven on one spindle) at a revolving speed of some 600 revolutions a minute. The average diameter of these wheels is some 10 ins. Of course, in this case water is invariably used, and the sandstone is of special quality, which means harder than the ordinary rock sandstone. Another method of grinding is by the use of the emery wheel, with sizes almost equal to the sandstone wheels mentioned, the chief difference being that the emery wheels revolve at about three times the speed of the sandstone wheels. If it were safe, however, to speed up the sandstone wheels equal to the emery, the grinding powers of the latter would greatly excel that of the former. Some men favor dry grinding with the emery wheel, but personally I object to this practice. With dry grinding, it is, in many cases, impossible to preserve the normal and proper temper of the tool's edge, with the result that some parts of the edge of the cutter will become blunt more readily than other parts, thus producing inferior work. All emery wheels, especially those for grinding revolving cutters, should each have a cold-water jet providing a continuous flow on the wheel while the tools are being ground.

Hollow Grinding

For some tools hollow grinding is preferable, but if it were possible to produce a straight-angled edge, such would certainly be the superior method for grinding revolving cutters. Many operators prefer hollow grinding owing to the fact that such reduces the necessary frequency of grinding, but this is by no means an adequate excuse for adopting the system. The angle at which cutters should be ground is another question. Some men are under the impression that the correct angle for softwoods cutting is quite unsuitable for hardwoods. However, the difference is so slight that the use of varied angles for hard and soft woods is not advisable. The angle here mentioned is not the cutting angle. It matters not what "covel" or angle is given to a cutter, the cutting angle on a four-square block is invariably identical.

The fixing of cutters by the dovetail bolts and screws is a very important matter, and some men, though having experience of the work, do not grasp the many complex conditions involved. Some use cardboard pads between the cutters and the block; others say that such is unnecessary. Others will venture a projection of 3½ ins. to 4 ins. on their irons (which in some cases means a rim or periphery travel of 12,000 feet a minute). On the ground of danger, owing to the apparent probability of the cutter flying off the block, many machinists would not venture to use such a projection. Of course, with modern machines having canting heads the expediency of adopting such a high projection as that stated is obviated.

The size of heads and the type of bolts are also features concerning which varied opinions are expressed. Almost all woodworking machine experts generally say that each and every machine is perfect and that improvement is impossible. I take exception to this attitude and venture to say that he who does not see room for improvement in the mechanical design and construction of almost all machines is not sufficiently qualified to reliably describe the many intricate features and conditions associated with woodworking machinery. Recently, an expert implied that owing to the size of the dovetail bolts generally used on the square block, the strain of centrifugal force prevented a higher cutting velocity than 7,500 ft. a minute being given to the cutters. This statement may be true to a certain extent, when based on the existing size of bolts and nuts in ordinary use. However, it would be quite possible and practicable to increase the dovetail grooves on two sides of the square block, and the bolts and nuts likewise, so that centrifugal force would be no barrier to adopting a periphery velocity of 12,000 ft a minute.

The nature or action of centrifugal force on the cutter heads of woodworking machines is apparently frequently misunderstood. The pressure exerted, and the supposed danger accruing from this agency, depend on the shape of the cutter and its position on the block. For instance, a cutter 5 ins. by 2½ in., with a bolt groove of 3½ ins. long when screwed in the centre of the groove, or at the point where there is equal weight of iron on each side of the bolt, does not require one-quarter of the screwing strain as compared with having the bolt within an inch of the end of the cutter. It is impossible for any machinist to determine the correct pressure to exert on the spanner while screwing up his nuts, but he should invariably remember that equal hand pull or pressure on the spanner is not always advisable, as such should vary in accord with the position of the bolt in the slot or groove of the cutter. By having the dovetail grooves of the cutter block somewhat near the corner, and not in the centre, as is the case in common practice, the strain of centrifugal force is comparatively reduced, and the strength of the cutting capacity of the cutter increased.

An interesting question recently arisen is, which is the better type of cutter to use, viz., the solid-steel type or the steel face with iron back? For moulding purposes the last-mentioned cutter has several advantages, and for this reason probably the iron-back cutter will never be superseded by the solid steel; but for plain dressing the solid steel cutters are vastly superior. Not that the latter will produce smoother or better work, but they are more easily and readily ground, and a much higher revolving speed can be given to them. The merits of the solid-steel cutters are specially evinced when fixed in the round softy block. A keener cutting angle can be given to this cutter on the softy block than is possible on the square block.

Though there are no definite rules fixed for the number of bolts required for wide or narrow cutters, it may not be out of place on my part to suggest a commendable average: 12-in. cutters four bolts, 11-in. four bolts, 10-in. three bolts, 9-in. three bolts, 8-in. three bolts, 7-in. down to 3½-in. two bolts, 3-in. and under one bolt. Two sides of the cutter block should be grooved to suit ⅝-in. bolts; the other two sides should be grooved to suit bolts in ⅞-in. diameter.

Many machines take unnecessary pains to balance their cutters and will not fix their irons on the block if the weight of these irons is not carefully tested in the scales. The idea that each cutter must have its

counterpart in identical weight is not absolute, and this practice assuredly emanates more from supposition than from necessity. An ounce or a fraction of an ounce of difference in the weight of matched moulding cutters is of no importance, and, practically speaking, if the bearings of the head are in proper rigid order one iron could be run without a balancer at all. Many will imagine that this is a bold suggestion, but I am prepared to substantiate same by experiment at any time on any modern reliable machine. Very few, if any, machinists attempt to have two irons striking the one mould. In fact, it is practically impossible to grind or fix two shaped cutters so that each will perform an equal amount of work, hence to try to do so is simply a waste of time. For the manufacture of shaped moulding one cutter in action is quite sufficient, and almost any iron which is approximately of equal weight will quite efficiently serve as a balancer.

Box-Making in British Columbia

The Well-Equipped Plant of the Pacific Box Company, Limited, Vancouver

THE rapid expansion noted in all lines of business in British Columbia prior to the declaration of war had an especially stimulating effect upon the box-making industry; and it is worth noting that while the depression due to the dislocation of the world's commerce has been felt most severely by the lumbermen of the province as a whole, the box manufacturers have been enjoying a good run of orders at fairly remunerative prices. This is to be ascribed in the main to the rapid development of the fruit and vegetable industry, together with the deep sea fisheries, which call for enormous quantities of containers for shipping purposes. In addition to the largely increased home demand for boxes a considerable foreign trade has developed, with the result that several sawmills having box factories in connection are now filling huge orders for the United Kingdom, Australia, New Zealand, and elsewhere, the material being shipped in shook form, to be assembled as required.

Pacific Box Company's plant at Vancouver.

One of the best of the Vancouver factories is that of the Pacific Box Company, Limited. The business was established in a small way on Prior Street in 1906, but in 1913 the present company erected works on False Creek, at the foot of Smythe Street. Here—in the very heart of the city—they occupy a site of three acres with valuable water frontage. The modern factory erected at the land end is 109 x 108 ft. in dimensions, of two storeys. Between the building and deep water there is piling ground for a large stock of lumber. At the present time over two and a half million feet are being carried in order that it may be thoroughly seasoned before use. The lumber is transferred on trucks from the pile to the machines on the mill floor. The equipment includes a fast-feed Woods planer (capacity 250 ft. a minute), a large Berlin planer, pony planer, horizontal and vertical resaws, and the latest design of dovetailing machine (three machines in one) which has a capacity of four thousand finished boxes every ten hours. In all, the plant has twenty-one different machines, two fans and one blower, to operate which there are twenty-four electric motors ranging in horsepower from 5 to 80. Some of these are direct connected to the machines. The equipment represents the latest and most improved machinery for making boxes, either in shooks, nailed or dovetailed. At the south end, on the first floor, is a filing room having Covel and other machines for saw and knife sharpening and repairs.

The capacity of the sawing floor is 40,000 feet of spruce, hemlock and pine lumber a day. When sawn the shooks are transferred by hoist to the second floor for assembling, nailing and printing. There are two printing machines, one having double cylinders for two-color work.

Mr. R. W. Sharpe, under whose efficient management the company has made steady progress, says that the plant can supply boxes for any purpose and in any quantity. The business is largely with manufacturing concerns, fish packers and fruit growers, but

numerous orders for special sizes are received and filled from time to time. So far, the firm has not accepted any foreign orders, the demands of the B. C. and prairie trade having taxed the capacity of the plant.

Spanish Market for Boxboards

THE United States Consul at Seville, Spain, in a communication to the Bureau of Foreign and Domestic Commerce, recommends that American manufacturers of box shooks (boxboards) turn their attention to the Spanish market. He says that some educational work will be necessary, but believes it possible to deliver shooks there at prices that will compete with those manufactured locally. The communication says in part:

"The fact that there are between twenty and thirty different sizes of boxes in use here would necessitate holding in stock a large quantity of shooks in order to supply the demand, resulting in a large investment that the lumber importers or box dealers are not in a position to carry.

"Another point made by local dealers is that if they carried shooks in stock that were imported from abroad they would not be able to secure from the local box factories such boxes as they might need, of unusual size or on rush orders, since the local box manufacturers would give preference to their regular customers as against persons importing and operating in opposition to them.

"The climate of Seville is extremely dry, especially in summer, and it is feared that wood held here for any long period would become too dry or warp so badly as to be useless. To avoid the carrying in stock of large quantities of shooks or boxes they are cut only as necessity arises.

"Arrangements would have to be made by the local importing firms for the nailing together of the boxes after their arrival here, and it is thought that this would necessitate the erection of factories. The opportunity seems to be here, but personal solicitation would be essential. It is doubtful whether orders can be secured through correspondence, but estimates of the cost of shooks might be submitted to the firms interested, and might possibly result in securing orders. Copies of the price lists, terms, etc., should also be sent to the Seville consulate in order that they may be shown to other interested persons.

"It will probably be necessary to arrange favorable terms with the shippers, giving them credits of at least ninety days, and the trade will be possible only if quotations are made c.i.f. Seville. It is likely that shipload lots would have to be sent in order to secure satisfactory freight rates."

Wood Products in the War

SO completely novel are the conditions of the great war that all sorts of strange expedients are being adopted. There is said to be one big firm of bobbin manufacturers in the north of England at present turning out wooden rifle bullets. These are made of hard wood, and are being painted red. They are exactly the same size as the ordinary service bullet and are being turned out by the million. They will go through two inches of solid wood at fifty yards range, and would presumably be quite effective at modern fighting distance. It may be that these novel projectiles are intended purely for practice purposes, but one hardly thinks so, from information available. Other firms of the same character are turning out millions of wooden discs, resembling large serviette rings, but with a bottom to them. These things look rather like the crust of an ordinary pork pie that has been cut in half horizontally. Their purpose is no mystery. They are intended to be filled with high explosives and to be thrown as hand bombs. They are light and easily thrown, and will truckle in a convenient way.

Economical Motor Drive in a Modern Box Factory

THE principle of economical motor drive has been carefully carried out in the new woodworking factory of the American Box & Crate Company at Louisville, Ky. Wire-bound boxes and crates are made, and while the equipment used does not differ essentially from that of many other woodworking plants, the entire absence of shafts and belts is decidedly noticeable. The machines are installed so as to produce the greatest economy of time and labor in handling of material between operations and in disposition of the finished product. The factory building is 75 ft. wide by 150 ft. long, two storeys high, and of wood and sheet-metal construction. Dust and shavings ducts are provided for each machine with one additional opening at the floor level so that the floors may be kept clean. The refuse is carried to a bin in the rear for storage and sale for stable use. The motors are 440-volt, three-phase, sixty-cycle, with all wiring in conduit. Lighting service is taken from the motor circuits. Two small transformers of four-to-one ratio are installed.

Machine Driven	Motor H.P.	Motor Speed
No. 238 double-end Fay & Egan crate trimmer	15	1200
Fay & Egan single ripsaw	5	1800
Hall & Brown single cut-off saw	5	1800
24-in. American single surfacer	10	3600
Hall & Brown double self-feed ripsaw	10	1800
24-in. Hall & Brown single surfacer	10	3600
45-in. Garden City blower	10	1200
36-in. Fay & Egan bandsaw	2	1800
36-in. Hall & Brown sand disk	3	1800
Line shaft drives one No. 6 and one No. 4 Doig nailer	5	1800
Line shaft drives special miter machine, 36-in. Hall & Brown knife grinder, 7-in. Emery Hall & Brown saw sharpener, Hall & Brown hand-hole machine and emery stand	5	1800
2,000-lb. freight elevator	5	1800
Total connected load	85	

An interesting feature of the installation is the use of motors operating at 3,600 r.p.m. directly connected to the planer heads of two 24-in. American single surfacers. It was thought at first that there might be excessive vibration and wear due to high speed of motors. However, this has not proved the case. The drive as such is said to be most successful and economical in energy consumption. The cost of operating this plant to date has averaged about $5 a day, at a rate slightly under 3 cents a kilowatt-hour.

In connection with one of the "war clubs" in England there is a shoe repairing department where the wives of soldiers are given instruction in making repairs.

Straight Eye Trees

No. 1. 2 ft. 6 in. or 2 ft. 8 in.

Bent Eye Trees

No. 2.—2 ft. 6 in. or 2 ft. 8 in.

Straight Crutch Trees

No. 3.—2 ft. 4 in.
No. 3.—2 ft. 6 in.

Bent Crutch Trees

No. 4.—2 ft. 4 in.
No. 4.—2 ft. 8 in.

Straight Crutch Trees
(With Turned Socket)

No. 5.—2 ft. 2 in. or 2 ft. 4 in.

Bent Crutch Trees
(With Turned Socket)

No. 6.—2 ft. 2 in. or 2 ft. 4 in.

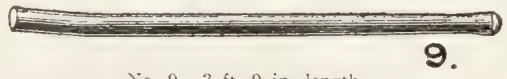
Straight Crutch Trees
(Turned Taper, not Shouldered)

No. 7.—2 ft. 6 in.

Bent Crutch Trees
(Turned Taper, not Shouldered)

No. 8.—2 ft. 6 in.

Manure Fork Trees
(Single Bend)



No. 9.—3 ft. 9 in. length.
1 in. diameter

Manure Fork Trees
(Double Bend)

No. 10.—3 ft. 6 in. length.
1½ in. diameter.

Pick Shafts
(Open or Solid Eye)

No. 11.—3 ft. 0 in. best ash
No. 11.—3 ft. 3 in. best ash
No. 11.—3 ft. 6 in. best ash

Hand Hammer Stails
(Best Ash)

No. 12. 12 in., 13 in., 14 in., 15 in., 16 in., 17 in., 18 in., 19 in., 20 in., 21 in., 22 in., 24 in.

Sledge Hammer Stails
(Best Ash)

No. 13.—2 ft. 3 in., 2 ft. 6 in., 2 ft. 9 in., 3 ft. 0 in., 3 ft. 2 in., 3 ft. 3 in., 3 ft. 4 in., 3 ft. 6 in.

Axe Handles
(Best Ash)

No. 14.—2 ft. 0 in., 2 ft. 3 in., 2 ft. 6 in., 2 ft. 9 in., 3 ft. 0 in., 3 ft. 6 in.

TYPES OF TOOL HANDLES REQUIRED BY GREAT BRITAIN

Tool Handles Used in Great Britain—An Opportunity for Canadian Manufacturers

From time to time numerous inquiries for wooden tool handles have been despatched to the Department of Trade and Commerce, Ottawa, from England. In order to illustrate as fully as possible the kinds of handles chiefly in demand, the drawings reproduced on the opposite page have been prepared. As far as investigation in the past shows, the main obstacle confronting Canadian manufacturers was their inability to produce at competitive prices. In ante bellum days it was practically impossible to compete with European manufacturers; but conditions are so changed at present, and will undoubtedly change still more after the war, that Canadian manufacturers should make a special study of the British market ad interim. With the exception of hickory, Canada has large tracts of timber suitable for the purpose, and with the installation of the latest machinery, a market worth millions of dollars annually should be at the disposal of manufacturers.

The Efficiency Window Frame Machine

THIS machine combines a double end gainor, pocket cutter, and pulley mortiser. The machine cross cuts the ends of the pockets, dadoes the head and sill gain, and routes the pulley mortises simultaneously in a set of jambs at one operation. The slitting of the pockets is done by the operator while the machine performs the balance of the work automatically.

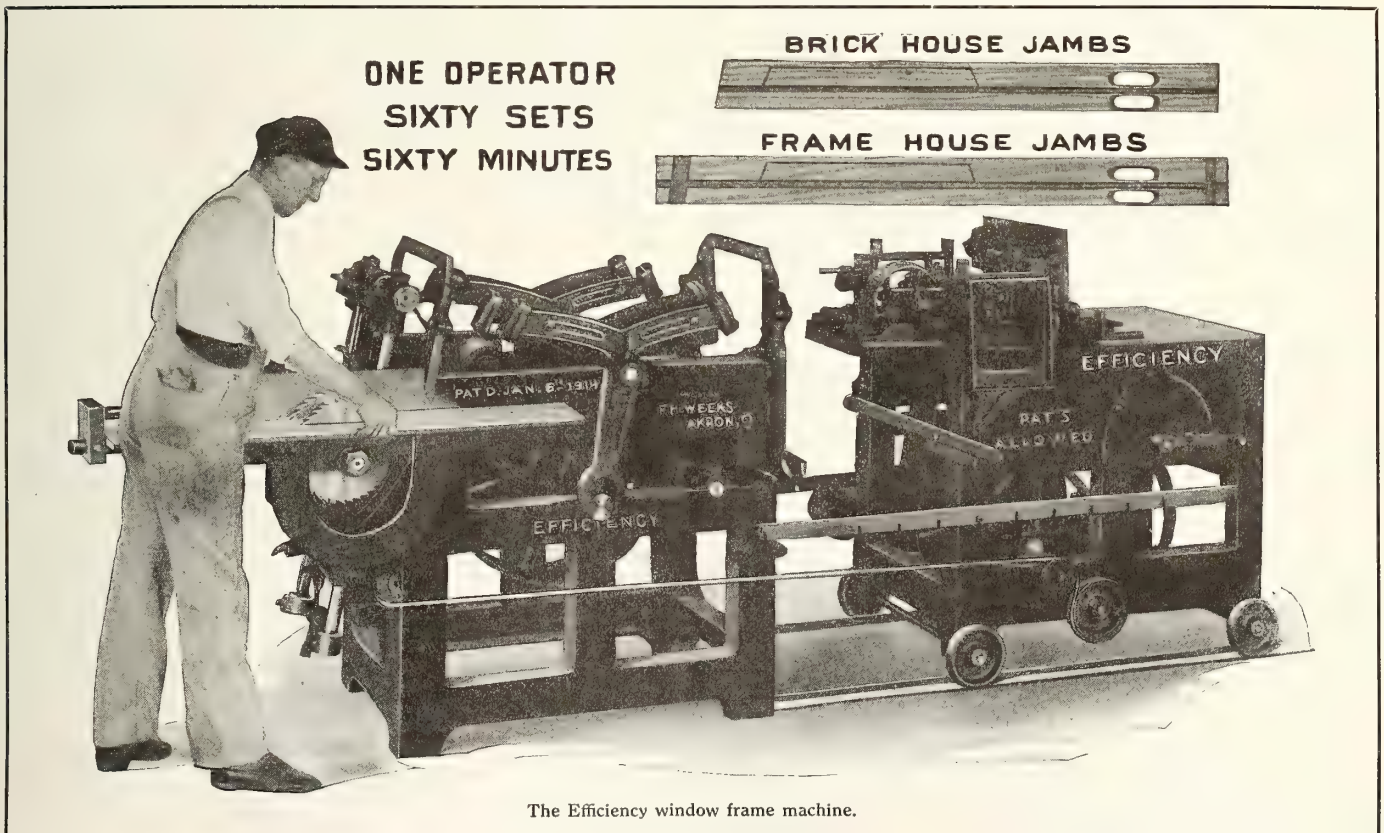
The range and flexibility of the machine cover all changes ordinarily required to perform the work on jambs of almost any description. Any one or more of the operations may be performed separately or simultaneously, as desired. In the manufacture of frames for brick or concrete buildings the jambs may be cut to length and the ends bevelled for any slope of sill required. Jambs may be handled from 3 feet up to any length desired, to any thickness up to 1⅜ inches, and of any width desired with a maximum of 3 inches between the parting strip and the blind stop. The sill gain may be rabbeted for any thickness of sill required up to 1¾ inches thick, and to any depth. The machine will cut pockets any length 18 ft. to 28 inches in any required width.

The "Efficiency" is an exceedingly simple machine, of substantial construction. It has been tested out under severe conditions, and it has lived up to all the claims made for it in regard to volume and quality. It puts in the pulley mortises, dadoes the head and sill gain, and slits and cross cuts the pockets, working the jambs in sets—which insures accurate pairing. The transfer of the stock to and from various machines is eliminated. The several operations, the numerous changes of position and the various machines required to produce pulley stiles under the methods and machines in general use are reduced to one operation, one operator, and one machine. It effects a saving in floor space, power, belting and upkeep.

The combined machine requires 4 h.p., transmitted by a 4-inch drive belt running on a 14-inch diameter pulley. All the bearings are of good length, and the shafts of ample size. The pulleys are of light weight, carefully balanced. All loose pulleys or idlers run on 1¼-inch tubular shafts packed with waste for the absorption of oil, holding same in reserve for time of need.

The floor space occupied by the machine is about 4 ft. 6 ins. by 10 ft., while the weight ready for shipment is 2,000 lbs.

The manufacturers are the F. H. Weeks Lumber Company, of Akron, Ohio, from whom terms, prices, and further description may be obtained.



The Efficiency window frame machine.

The Magpie Note in New American Furniture

THERE is no doubt about the fact that the use of color and color combinations in household decorations must to a greater or less degree express the emotional interests in life of the nation originating those combinations, just as in Holland, the gray land of intense people, the houses are painted warm reddish brown and the sails a rich blue and the gardens flame with the most brilliant flowers in the world; while in France, where the fields and hills are saturated with sunlight, and the nation more or less artificial, the most delicate color tints and combinations of harmonies have originated. The present craze for color or for black and white in juxtaposition with color sprang out of the interests of the Hungarian and Austrian peasants, whose lives are dull and whose temperament is quicksilver. In fact, the most interesting designs used to-day in the Vienne Werkstaatte were taken from the brilliant compositions of some of the old Hungarian pottery. Lotta's richest fabrics suggest Hungarian peasant work.

This old ivory table, with its carved grooved legs inlaid with black, its curved wood at the base, and the band of vertical black-painted grooves around the top, is distinctively decorative: the same effect of old ivory surface and black stripes has been carried out in the lamp and book ends.

Our attitude toward all of this more or less new art movement has been one of amused interest, says The Craftsman. It is as though we had said: "It is humorously pleasing for the moment; it astonishes our neighbors, and it gives us an air of being innovators." But this point of view never accomplishes anything. It is essential for one's interest to be deep-seated, to create what is either beautiful or permanent, and all along with this Viennese movement we have known that we were merely sidestepping for a fad, never for a moment making actual progress in creating a valuable style in American furniture.

A notable exception to this certain flippant tendency in modern furnishings is the beautiful ivory and black furniture created by the furniture craftsmen, A. H. Notman & Company, of New York. The designs of this furniture are distinctly elegant. The ivory is so rich and soft that it has the effect of being treated with wax. The black is so handled in the low relief that it does little more than give the effect of carving. It is a furniture which lends itself most interestingly to Oriental color harmonies, to French delicate period designs, or to modern block-printed linens and raw silks.

The same firm are also presenting what they call polychrome furniture. This is ivory white in ground, cut in low relief for ornamentation, and black, dull red, green, yellow and blue filled-in designs, a kind of decoration, we are told, employed by the ancient Greeks and Romans in their household articles, as well as in their architecture, and to be found in the relics that are even now being unearthed from the buried ruins of Pompeian homes. In our illustrations we are showing only the Notman ivory and black furniture, as the coloring in the polychrome ornamentation is more rich and interesting in effect. This furniture is so unusual, so distinctly original, so suited to a variety of backgrounds and personal tastes, that we feel it important to describe it in detail.

The grooves are painted black, and the surface is treated with a special mixture of paint which gives a curious, mottled, rich ivory effect, calling to mind old museum pieces so enriched with age that they seem to have gone through a process of delicate mellowing that the finest craftsman could not achieve. The black stripes and bands and other decorative marks give a peculiar emphasis against the old ivory, and form a contrast which is both rich and subtle, curiously complete, and permanent in result.

As this furniture carries only two tones, used in a decorative fashion, it is peculiarly effective in relation to plain colors in upholstery, draperies and walls. Pompeian red, burnt orange and deep vivid blue velours are particularly rich in combination. Rather delicate shades of rose or even lavender may also be employed, but brown should be sternly avoided. Tapestry effects, or some of the new block-printed linens thought out in relation to the draperies, would be gratifying. As there is sufficient of the black and ivory stripe effect in most of the tables, chairs and lamp shades, it will be found best not to use the same pattern for draperies, as repetition of motif in furniture and upholstery is apt to be monotonous. Indeed, plain hangings at the windows and other openings would probably prove the most effective background for the furniture, giving at the same time an atmosphere of restfulness.

The table and lamp in one of the illustrations, even without any other surroundings, form a unique and charming group. The legs of the table and the wood which connects them at the back are carved and decorated in the same manner as the armchair previously described, and the rest of the table is finished in dull mottled ivory, with a peculiarly decorative effect in

the band of vertical black grooves around the top. The interest which the makers of this furniture have devoted to its design is further evidenced by the mottled ivory lamp stand with its black trimmings and black and white fabric shade, and the ivory and black book ends.

The chest of drawers serves as another attractive example of the way in which the decoration of this type of furniture may be used. There is a suggestion of almost sturdy peasant craftsmanship, but the regular and delicate carivng elevates it to a more elegant plane. As usual, the carving is in keeping with the structural requirements, one pattern being used on each drawer, and the knobs being placed in the centres of leaves, where they seem to be part of the pattern. Additional emphasis is given by the stem of conventionalized leaves carried part way up each side. As in the other cases, the indented portions of the carving are filled in with black.

Polychrome furniture presents a unique combination of modern convenience of structure and design

Another illustration of this style: chest of drawers.

and the quantity-carved and colored style of decoration used by old Spanish cabinet-makers. In these decorations are united quaint symbols and heraldic devices of various hues, likewise conventionalized trees, foliage, flowers and geometric designs. As to color, the main surface of the wood is usually of a dull, irregular old-ivory tone, somewhat like the old ivory of the furniture illustrated in this article, while in the carving are blended often a dozen or more different colors or shades, ranging from cream, pale greens and browns, soft greens and blues, to more definite notes of red and orange, the whole effect being rich and unusual.

In fact, these departures open up a new line of initiative in the cabinet-making world and may help to lead eventually to the creation of definite styles, suited to the drawing rooms of those who prefer a rather formal type of elegance, or the living rooms of those whose tastes run along simpler lines.

The success of such furniture is bound to bring about a greater interest in original designs to harmonize with interior fittings. We have found, through the work of such cabinet-makers as these, that the time has not gone by for interesting and well developed new cabinet work.

Care and Selection of Moulding Cutters

By H. Van Earl

CAREFUL attention should be given to the selection and upkeep of proper heads and cutters, as by these means only can you produce perfect mouldings at minimum cost. Too often this matter is left in the hands of an incompetent man, who is not acquainted with the new methods of manufacturing mouldings with slip-on heads and milled to pattern cutters. Nor is he competent to grind the knives for the square slotted heads, keeping them always in perfect shape to make the pattern of one run match the pattern of a previous run.

The care of the knives should be put in the hands of an able stickerman. Where a number of machines are in use it will be found profitable to have one man do all the grinding for the various moulders, keeping his knives always sharp and ready for use, and keeping them filed in the racks in proper order.

It pays well to use a little system in this filing, keeping the various shapes separate and placed on one shelf. For instance, the various patterns of one-half round, ogees, coves and crown mould should be placed on shelves by themselves, so that a man can instantly lay his hand on the pattern desired. This will save a great deal of needless expense through loss of time and enable him to know at a glance if new knives will have to be made to make a new pattern.

The slip-on heads with milled knives have eliminated much of the trouble in keeping up knives and in making them conform to patterns, while the work can also be done at a considerably less cost, as these knives are ground straight across the face, and the tedious work of fitting knives to patterns, especially the stock patterns which must always match, has been entirely eliminated.

The knives are interchangeable in these heads, so that with a small number of heads, a large number of stock patterns can be made by changing the cutters in the head. As this work is done in the filing room while the machine is running, no time is lost in changing from one pattern to another, except slipping the heads on to the arbor of the machine.

By using the milled cutters, there is also the added advantage of increasing the feed, as six knives are used and all are brought to a true cutting circle by means of jointing with a stationary stone. This operation takes only a few seconds and permits you to carry three or four times the feed carried with an ordinary square head. For making detailed moulding, however, the square slotted head is slipped on in place of the head carrying the milled cutters.

It is best to make the various bevels and chamfers on the adjustable chamfer head. This is a very simple head to keep up. It is quickly changed and it will take care of nearly any bevel pattern required.

The use of these modern heads and cutters simplifies the moulding proposition to a large degree, as they are much easier to grind than the old style heads and cutters. The quality of work is also better, as the patterns will always match from one run to another; and the cost of production is lowered, as these knives properly jointed will do perfect work at a much faster feed.

What Form of Drive Should be Used?

WHICH is best—individual motor drive, group motor drive or shaft distribution drive? Nobody can answer that question directly, writes S. F. Woolworth in The Woodworker (Indianapolis), because sometimes the first method is best, sometimes the second, and again the third. Each special case requires treatment all its own, just as though you were determining the kind of power to use—steam, gas, water or electric.

Generally, where a machine is large, where it requires considerable energy, where it is used a large part of the time, and where considerable time can be saved by individual drive, such drive should be used. Again, where there are several such machines grouped together, although smaller consumers of power, group drive is recommended.

Shaft distribution is not so bad as it is usually painted, especially if the shafting, belting, bearings

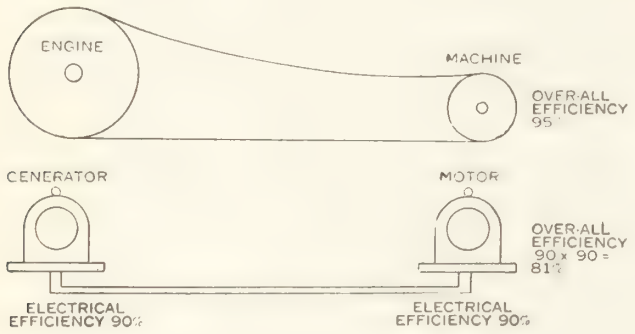


Fig. 1.

and pulleys are given a fair amount of attention. This is true, because, mechanically, the transmission efficiency of a belt drive is high. Fig. 1 shows a comparison of belt drive and individual drive where the belt to the machine is taken directly from the engine flywheel—a condition that is frequently possible. The over-all efficiency of the belt drive is shown to be 95 per cent., which is not overdone at all; 98 per cent. has commonly been attained in belting tests, and there is no reason why 95 per cent. should not be standard practice. The efficiency of common bearings is very high, and of roller and ball bearings still higher. There is no reason why shaft alignment should be permitted to get out of order; and the power loss due to belt creep and windage should always stay below 2 per cent. Hence, why should belt drive efficiency not be maintained at 95 per cent.?

In the electric transmission line I am using an efficiency of 90 per cent. for the generator and 90 per cent. for the motor, which, I should say, is about average. The over-all efficiency of such a drive, then, would be .90 x 90 equals 81, or 81 per cent. The belt drive is therefore 14 per cent. more efficient.

It is true that a special case is used here, but let us go a little farther and carry the belt transmission problem to another extreme, as shown in Fig. 2, where three intermediate shafts lie between the engine and driven machine. This occurs as seldom in practice as does the condition shown in Fig. 1. Assuming a belt efficiency of 95 per cent., as before, we find that the over-all transmission efficiency is still just as high as with individual drive, for .95 x .95 x .95 x .95 equals .81, approximately. Efficiency is now "nip and tuck" and the decision as to which to use would very likely lie with the first cost, convenience, dependability, etc. In first cost, individual drive usually is highest, but permits of greater production for obvious reasons.

Where machines are seldom used, even though the transmission efficiency may be higher with individual drive, such drive should not be used where first cost is great. This is true for the same reason that we often find it more economical to burn 4 pounds of coal per hour to produce 1 h.p. instead of 1 pound of coal. Yet, it is possible to produce even more than 1 h.p. per hour from 1 pound of coal, but the first cost of the process is too expensive for small plants. Besides, much depends upon the cost of the coal; therefore, efficiency of drive is not everything. The thing wanted in the end is maximum production per dollar invested, and this includes everything—labor, insurance, taxes, cost of safety appliances and even cost of such humanitarian devices as reducers of noise, rest-rooms, etc. In the end, it is often proved that such investments are really good and sound.

There are three ways in which this transmission problem is usually considered. First, from the angle of the manufacturer of the machine itself. Ask him for advice and he may tell you off-hand to purchase individually-driven machines, especially if he makes a commission on the motor that he sells with the machine. I am not accusing manufacturers, for most of them mean to be perfectly honest and fair to customers, but this point is worth bearing in mind by the purchaser. Second, from the angle of the motor manufacturer. He is liable to be even more biased in favor of individual drive than the machine manufacturer. The slogan of the electrical engineering societies is: "Do it electrically," which is very good, but we must not allow ourselves to be swept off our feet merely to use electricity. Nearly every problem, in our shops, is a "special" problem, which needs special analysis. Third, from your own angle—the angle of the user

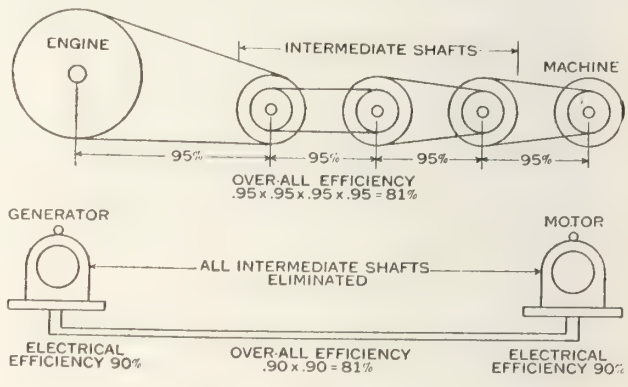


Fig. 2.

and owner. The thing wanted is—the best thing for you.

The point I wish to emphasize is this: keep the belt drives in highly efficient order if you decide on that kind of transmission. This can be easily illustrated by referring to Fig. 2 again. Suppose the efficiency of each individual belting unit is 90 per cent. instead of 95 per cent. Ordinarily we regard even 90 per cent. as being high. Yet with such an efficiency, the over-all efficiency of the entire drive would be only .90 x .90 x .90 x .90 equals .655, or 65.5 per cent., which is distressingly low in comparison with 81 per cent. Hence the importance of keeping belt drives efficient.

In Fig. 3 is graphically shown how rapidly efficiency falls in belt transmission with intermediate shafts. Thus, where the efficiency of a single drive is 90 per cent., the over-all efficiency drops to 65.5 per cent. with

three intermediate shafts. And where efficiency of a single drive is as low as 50 per cent., a single intermediate shaft drops the efficiency to 25 per cent.; two intermediate shafts drop it to 12 per cent.; and three intermediate shafts drop the over-all efficiency away down to 6 per cent., or almost nothing.

If any reader is not satisfied with the various efficiencies used here, he may use the actual efficiencies of his own machines or those that he proposes to buy. By computing along the lines indicated, however, he should be able to come to a fair decision as to what the

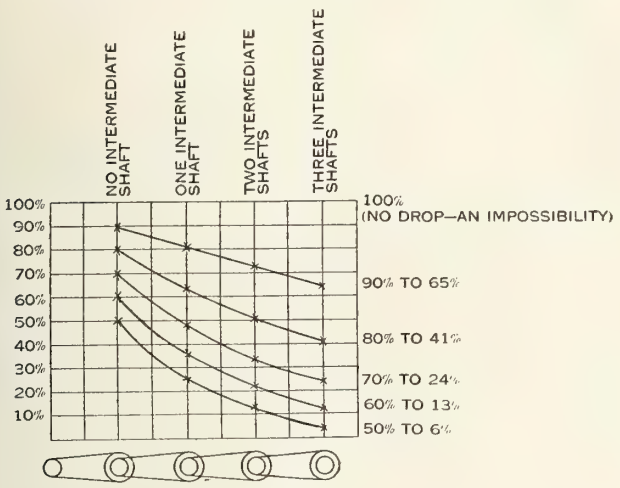


Fig. 3.

final efficiency will be. This article was shown to an electrical engineer, who stated that it would perhaps be better to use an electrical efficiency of 92 or 93 per cent. instead of 90 per cent., although he says that 90 per cent. is common. Be that as it may, the above methods would remain unaltered.

Profitable Use of Waste Stock

THE latest development of the continuous-feed glue jointer affords a fine opportunity to dispose of ends, edgings and other low-grade waste usually sold for kindling at a price so low that there is no money in it. Waste of this kind is being made into flooring squares and into cores for every kind of veneered or covered work.

The advantage of saving waste in this manner is that jointing the short or narrow blocks automatically on the continuous-feed jointer costs no more than jointing longer lengths. In fact, as many of these small pieces can be kept running together as long as the continuous-feed ways will hold, so that the actual jointing cost per piece is lower on these small blocks than on the longer work.

By running all the pieces automatically, a uniformly accurate product is secured that will glue together as solid as the natural wood. Panels made from waste in this way cannot shrink or crack the veneer as the ends are tight and the top joints are practically invisible. This same method builds one piece stock with greater capacity for packing cases. Such dependability in made-up stock draws a price that is in great contrast to the low figure offered for the same material when sold as waste.

Spiral turning is one thing that should be done well or not at all, for there is hardly any other kind of wood work that looks worse when poorly done.

The Hardwood Market

FOR some little time we have been able to report business moving back to a practically normal basis as to volume and price. It is gratifying to be able to report continued improvement, however small, for nothing is so annoying as to have to write, at the best—as the Germans have to write—"The situation remains unchanged."

The demand for munitions of war, various kinds of equipment, automobile trucks, and many other lines, is having a marked effect, while the market for grain, horses, provisions—and, in fact, for almost everything produced on the farm—has tended to buoy up trade in the agricultural districts. This is logical—and conservative at that—for if conditions had been normal the great wheat crops of last year and this would have brought much less to the producers—if, indeed, the farmer had been able to secure even a reasonable margin above the cost of production. While it cannot be maintained that the hardwood industry has kept pace with the softwood, a distinctly improved situation is found. Retail yards and interior finish factories are buying more freely, furniture factories are becoming more active, and sufficient of the hardwoods is being consumed for box and crating purposes to make a distinct addition to the volume of the trade. The demand for plain oak has been the most marked, while birch has been moving a little more freely. Generally there has been good inquiry for walnut. Maple and basswood are in better demand than they were. United States centres report the demand for red gum in the better grades broadening, as increasing quantities are going into the manufacture of furniture and interior trim.

The following extracts are from the last market report of the Southern Lumberman:

"Improvement in the hardwood market is becoming more general as the fall season advances and consuming factories get into the market for larger supplies, and as the railroads and building operations require greater volumes of lumber. The betterment in the demand for hardwoods is slow, but is now recognized by consumers as well as manufacturers through shortage of stocks that are frequently inquired for, and the consequent increases in price which have been manifest for the past two weeks.

"The cause for this improvement is easily found in the better conditions governing general business, and in the increase in prices of cotton and farm products generally. The great crops which it has been predicted would bring about prosperity are now proceeding to deliver the goods. It is not so easy to point out the particular sources of demand that are causing the increased consumption. It is rather an enlargement of all of the several channels in which hardwood lumber is used. In fact, the very variety of the inquiries received is one of the chief causes of gratification to manufacturers and dealers.

"The railroads and car builders are among the best buyers of hardwoods of late, with planing mills, manufacturers of interior finish and flooring plants also well to the front. The call from vehicle and implement plants continues, though that from box factories is hardly so insistent as for the past several weeks. Furniture manufacturers continue to buy steadily, but chiefly for immediate needs, though stocks on hand at their yards are admittedly low. The call for the several woods shows little change, the best movement being in oak. Red oak is somewhat more active this week, as is also low-grade chestnut, while the unprecedented demand for walnut continues. Poplar, ash, hickory and other woods remain unchanged."

QUESTION BOX

A Practical Department of Reference for the Practical Man

Wood Boring Bits

Q. "The writer noticed with interest a short time ago, an answer in this department, which had to do with the speeding and feeding of wood boring bits, and the suggestions contained therein were so sensible and to the point that I am inclined to ask a question of my own concerning bits, the solution of which I have not been able to obtain. What is it that causes the cutting lips to burn and crumble at what seems to be a perfectly legitimate speed, and is there any way of making these lips stand up as well as the cutting edges, which seldom wear as rapidly as the lips?"

A. The lips on a wood boring bit wear out sooner than the edges because they have harder work to do, and because it is impossible to make them proportionally as able bodied as the edges. The lips always cut across the grain, while the edges cut with the grain, simply lifting up the layers of wood which are freed by the lips and cutting them up into chips. The lips are certainly the weakest parts of the bit, but the design of their cutting edges has a lot to do with their usefulness and life. Edges shaped as in Fig. 1 are

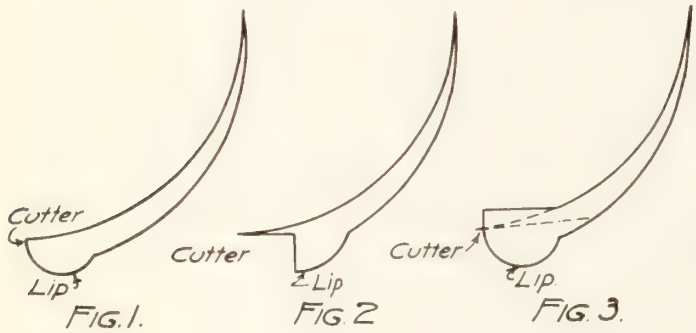


FIG. 1. FIG. 2 FIG. 3.

the shortest lived because they do not cut, but rub off, the wood. The edge in Fig. 2 is better, but the lip is too close to the cutting edge and cannot be made large and strong enough to carry off the heat generated in the cut, consequently the edges burn and crumble. Fig. 3 is the best design the writer has ever encountered, as the lips are large and strong, have plenty of clearance, and leave plenty of room for the filing of the cutting edge, while the front point of the cutting lip cuts freely through the wood and has no tendency to ride up out of the cut. A bit with a round pointed lip may be filed in this shape if care is taken to give the cutter clearance in both directions and a good sharp edge.

The Upkeep of Loose Pulleys

Q. "A loose pulley is admittedly one of the worst propositions we have to deal with in keeping the expense account within reasonable bounds, and we naturally expect some trouble now and then, but we have a pulley running here which is getting beyond what we can afford in the way of upkeep. It is a sixteen inch pulley carrying a nine inch double belt on a two and three-sixteenths shaft, and is probably overloaded. We could change the drive, but only at a considerable outlay which we wish to avoid if possible, and are therefore asking your advice to see if you will suggest something which may work satisfactorily where all ordinary means have failed."

A. You have not stated the speed at which this pulley runs, which has a good deal to do with its operation. You might, by changing the final drive of your machine, be able to slow up the loose and tight pulleys sufficiently to bring them within the proper working strain, and this would be a sensible thing to do in any event as it would probably save considerable wear and tear on the belt and on the machine. If this is out of the question or does not cure the loose pulley, you had better get a ball bearing pulley of a suitable size as recommended by the manufacturers of the ball bearings, and I am sure you will have no more trouble.

Processes for Creosoting Lumber

Q. "We would like to know something of the different processes for creosoting lumber, especially cross arms, ties, paving blocks, etc., and, particularly, if any process has been devised for making the creosote penetrate clear to the heart of the wood, without the necessity of long and expensive soaking in a vat."

A. Creosoting lumber in this country may still be considered in its infancy, and I do not think there are at present any creosoting plants in operation, except those which use the old fashioned method of dipping in a tank. The process is, at its best, only a surface treatment and of little use as a long time preservative, such as is required if the wood is to be placed in the ground or subjected to the continued action of moisture. It is perhaps for this reason that the wood paving block has not come into more general use, but it is certain that, if properly treated with creosote, a wooden block makes an ideal pavement for any kind of traffic.

Leaving surface treatments out of the question altogether the most successful plants for impregnating lumber are those which employ power which hastens and improves the process, and the following is a brief description of the essential parts of such a plant. The treating chamber itself is generally a steel shell, cylindrical in shape, not less than six feet in diameter and from 12 to 16 feet in length, closed at one or both ends by air tight circular doors completely covering the end of the shell. A track is laid inside the shell, communicating with the outside track the same as in a dry kiln arrangement, thereby enabling the lumber, to be treated, to be loaded on trucks outside the tank and then rolled inside for treatment without extra handling. This treating tank is generally mounted over a concrete pit or storage tank containing the creosote, the capacity of which must be about one and one-half times as great as that of the tank itself. The

lumber is loaded on a truck outside and rolled into the tank, the doors being securely fastened. The air in the tank is then exhausted as much as possible and eliminated from the surface of the wood to facilitate the absorption of the liquid which is now allowed to flow in around the lumber until the tank is entirely full. A further charge of creosote is now injected into the tank, increasing the pressure and forcing the creosote into the pores of the wood until it is sufficiently impregnated, the length of time necessary being ascertained by experience according to the various requirements. The creosote is now allowed to drain off, and the car is then removed from the tank and allowed to stand in the open air until the surfaces of the material are dry. The process is continuous, and plants of about the size of this one have been known to be able to handle from two to four thousand feet of lumber per day, depending upon the sizes and condition of the pieces.

The Cutting of Belt Holes in Flooring

Q. "I have been a millwright a number of years, but, as it happens, have never been required to cut holes in a fine piece of floor for a belt, where it is not permissible to cut the holes large enough to overcome the error in my measurements. Can you tell me what the method is by which holes of this kind are located I believe it is a simple matter, but do not know how to go to work."

A. First make a profile sketch of the building, showing the location of the line shaft, its distance below the floor (C) its distance from the post (B) and the size of the drive pulley. Find a clean piece of floor somewhere and mark this sketch off full size, then get the distance of the driven pulley from the

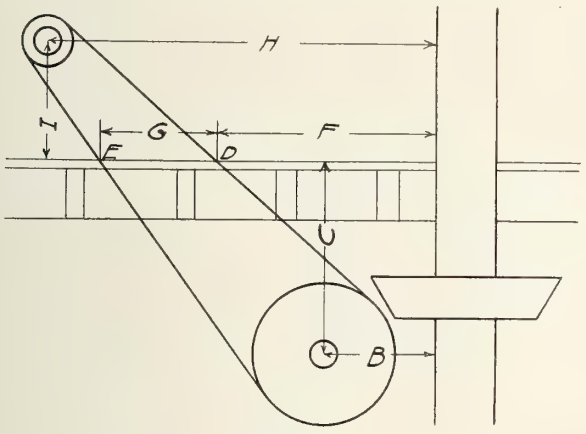


Fig. 4

post (H) and the distance from the floor to the driven pulley (I) and mark the location of the end of the shaft, also the size of the driven pulley. Now draw in the belt as it is to run, either straight or twist, and by measuring from the post to the points (D) and (E) you have the locations for your belt holes, and you will also see at a glance if you are going to have to cut any floor joists and if this is not desirable, how to place your machine to avoid it. If you make your sketch with even remote accuracy as may be obtained with a piece of chalk and a two-foot rule you will come out all right and your belt will run exactly where you intend it in the first holes you cut. Of course, if it is to run slack, make the hole for the slack side a little larger so that it will not rub on the edges and have to be cut larger later. Make your job right the first time. It will improve your reputation.

The Advantages of Safety Set Screens

Q. "Safety set screws have been recommended for use on our shafting and transmission a number of times and we have tried some of them, but our men in almost every case have substituted the ordinary set screws, their ground for complaint being that the safety set screws do not hold and require a special key which is always missing when wanted. We would like to use them, and are interested to know what experience others have had in this line."

A. Almost without exception, the ordinary or protruding set screw is a very serious element of danger around machinery, and should be eliminated or protected to render it harmless. Men operating machinery are no judges as to whether or not things like this should be used, and it is certainly very peculiar that they will nine times out of ten adopt the practice which contains the greatest element of danger, probably because it is easier and less trouble at the time. Safety set screws are absolutely safe, and, when of the proper size and with the proper shaped point, which may be readily found by reference to any of the manufacturers, they are as strong and serviceable as any. Many times they are tightened up too much in a hole that is too large for the thread, so that the top is allowed to spread and is weakened in proportion. Well made threads and properly selected safety set screws will be found entirely satisfactory under any circumstances, and remove one of the greatest dangers to life and limb that exist in a mill. Insist on your men using them; supply plenty of wrenches or keys and you may save yourself the regret of an unnecessary accident.

Proper Belt Splicing

IN splicing belts, the splices should usually be about an inch longer than the belt is wide. For example, a 6-in. belt should have a 7-in. splice. The first operation is to thoroughly scrape down the belts at the points of splice. After scraping, these parts should be kept clean. Care must be taken to avoid rubbing the hands over the scraped surfaces, otherwise the glue will not stick. Before applying the glue, the belt should be warmed, so as to form a good receiving surface. Spread the glue with a brush so as to cover both lapping belt parts, and thoroughly heat the glue until it becomes quite thin, otherwise it will be of no use. While the glue is setting, some put clamps on to ensure tightness, or if the belt is a big one a block of wood is used. No matter what the size of belt, the writer always uses the block method, firmly rubbing the block back and forth, so as to remove air-holes or irregularities.

"The treeless plains of western Canada continue to allure American farmers, and in the last ten months 30,000 of them have settled in that country where land is cheap. They have taken with them about $25,000,000 in cash. Canada encourages the immigration of Americans. Since the war began, the number of settlers entering that country from the United States has been nearly twice the number from all the rest of the world."—The Hardwood Record.

The Jacobean Finish

(Staff Article)

THE Jacobean finish is now greatly in vogue and the lack of uniformity as to colour and general effect are quite noticeable in goods by different manufacturers. There is a Jacobean oil stain manufactured by the leading stain people, made expressly for this purpose and put up in tins. This stain is applied with a soft flat brush, it being put on evenly. Too great a surface must not be done at one time, as the stain dries fairly fast. It is what might be called a slow drier, so that the finisher has time to do the shading and blending so necessary, as the work of putting on the stain progresses. The piece of furniture to be stained, if it has been in stock for some time, should be gone over with fine sand paper, as the grain of unfinished oak always gets roughened slightly by exposure to the air. If this is not done the effect will be muddy and the appearance of the article very unsatisfactory. The average man who works in a finishing room is not apt to be an expert on furniture styles, and the word Jacobean does not mean anything to him, except to distinguish the goods in the white—that usually have twisted turnings—from others that are not so made. If the man who does the stain shading will imagine himself finishing a piece of furniture that is to look as if it had seen between two hundred and fifty and three hundred years' service, and had been rubbed and dusted by generations of domestics, and have a mental vision of what would be the result, he will know pretty well where to rub the stain thin and so produce the effect.

There is also the wearing away of the finish through the daily use of the article. Thus where a man would sit day after day at one particular place at a table, it would naturally follow that the place would be lighter in color, which would gradually shade into the original darker tone. The same idea would apply near the drawer or door handles, and the higher parts of turnings, mouldings and so on.

The usual method of imitating Jacobean finish is as follows: After the stain is applied to a portion of the article, take a good sized piece of cheesecloth and rub the stain by a rotary motion into the grain of the wood. Where the high lights are required more rubbing is needed. On the spiral turnings the stain takes hold very quickly, on account of so much end wood being exposed, and fine sand paper will be found necessary to "high light" those portions. It goes without saying, that a genuine old piece of Jacobean furniture would not show the regular lights and shades that are produced in the imitation—or better call it copied—modern article, but it would be rather hazardous to depart too much from a fairly regular disposition of the appearance of wear in the finish.

After the staining and blending are done, the article must be allowed to dry thoroughly at least twenty-four hours, this depending a great deal on the air conditions. A varnish drying room is a great help, as the shellac will "pull" the stain unless it is dry. Use two coats of thin white shellac, sanding after each, and then apply a coat of flat drying varnish and finish off by rubbing perfectly smooth with oil and pumice stone. Jacobean furniture should be stained inside as well, and the interiors of cabinets and drawers should be as presentable as the outside surface, and the material always of oak.

Jacobean styles are at present quite in favor, and if the manufacturers will keep on making and finishing them as well as most of them are doing, there is no reason why the style should not have a long run yet. For library and den furniture especially, there is nothing better than the good solid appearance of worth and service afforded by Jacobean.

This style looks particularly well in a good dark fumed finish, and, so far as the writer is concerned, it is better than the Jacobean finish both in appearance and otherwise. Frequently orders come in calling for fumed finish—which proves that others prefer it also. The finish on furniture made a few hundred years ago seems to have been a matter of less consideration than now. Doubtless oil, wax and elbow grease, helped by time, were the principal factors, and the long years show the effects we seek to reproduce in a few days.

Treating Knots for Finishing

SASH, door, and carpenter shops, appreciate that a most important detail of the preparatory work before priming or painting is the "knotting," stopping or killing of knots and pitchy places, says a writer in an English contemporary. Perhaps more trouble is caused in painting work, by knots and pitchy wood than by any other thing. The object to be accomplished is preventing the appearance of the knots in the finished work, by arresting their absorbent quality, closing their aperture and preventing the effusion of gum or sap. Here are two good formulas for this: mix together ¼-pint japanner's gold size, one teaspoonful red lead, 1 pint vegetable naphtha, 7 oz. orange shellac. Keep warm until the shellac dissolves. The mixture must be frequently shaken. Another formula is to mix together with a glue size a small quantity of white and red lead powder, and apply warm. The old method has been to shellac the knots. Try these formulas and see if they are not more satisfactory.

Emphatic denial has been given by General Bertram, Chairman of the Shell Committee, to the statement made in an Ottawa paper that 1,500,000 loaded shells, valued at possibly twenty million dollars, have been held in Canada and that shipment has been prevented owing to lack of wooden boxes in which to ship them. General Bertram states that at the request of the Imperial authorities a million shells are now being shipped. He says that boxes of all classes have been ordered for eight months ahead, and that the committee have just received 591,000 of another class. These boxes are stored all over the country.

The First Aid Column

A department within a department to which Foreman Finishers and others are invited to turn for a solution of the practical problems encountered in their work. Readers are particularly requested to give the trade the benefit of their experience from time to time by replying to the questions asked. A number of new queries are to hand this month. They are given below. Be a live wire. Let us hear from you.

Use of Oil Mahogany Stain

Have any of your readers had any experience in using oil mahogany stain, in place of water stain? We understand that the oil stain, so far as durability and colour are concerned, has been brought to a reliable state.

Answer by W. J. Beattie, Owen Sound, Ont.

Oil mahogany stain, or spirit mahogany stain, has been brought to a degree of perfection that bids fair to rival the water stain, at least for some work. The spirit stain has the advantage in not raising the grain, and I have seen sample pieces stained that were subjected to a severe test as to their non-fading qualities. The stain referred to is manufactured by the Marietta Paint and Colour Company, of Marietta, Ohio. It has a good depth and brilliance, and I would advise any one to try it and compare results where a stain of this sort might be more desirable than the water variety.

* * *

Answer by Kenneth McGilvray, Dundas, Ont.

Oil mahogany stain is very good on birch, etc., but on cedar and similar woods I prefer the water stain. As to durability and colour, I have not noticed a great difference between the two. Now and again I have found the former not all that could be desired.

* * *

Answer by Albert Hudson, Hespler, Ont.

The Marietta Paint and Colour Company have a mahogany oil stain that will hold its colour and not fade, thus equalling water stain.

Pin-holes in Varnish

We have had trouble with birch table tops finished in imitation mahogany. The varnish, in some cases, has been found to be full of pinholes. The tops are not filled, as this is not necessary. What is the cause of the pinholes?

Answer by W. J. Beattie

The pinholes referred to are caused by air-pockets in the grain of the wood. These miniature reservoirs become plugged with the sand dust, and in time "explode" as the varnish is drying. The action might be likened to that of a miniature volcano. Open grained pieces are of course the ones that do the trick, and you may frequently see one piece only in a top that has a sufficiently open grain to cause the trouble. A very thin filler, well rubbed in, will stop the trouble, or a thorough dusting may have the desired effect. Another possible remedy would be to blow the surface with a current of air from the compressor.

* * *

Answer by Kenneth McGilvray

I should say that the pinholes showed that the tops required filling. I do not understand the statement that this is not necessary.

* * *

Answer by Albert Hudson

Blotching or pinholing is caused by an oily or damp surface, by turpentine mixed with the varnish, or by improperly thinning the fluid used in reducing the varnish.

* * *

Answer by J. G. Walker, Factory Manager, Sprague Lumber Company, Limited, Winnipeg

Pinholes in varnish are caused by some parts of the wood being more porous than others, and may be overcome by using a thin glue size before varnishing.

* * *

Answer by R. Ferguson, Toronto

In my opinion, the wood should be filled, as birch has a grain that needs filling. Possibly the defect may be caused by the use of cheap varnish—always the dearest in the long run.

Fuming Oak Goods

We are having some trouble in fuming plain oak goods, on account of the difference in colour of the pieces of oak—especially in the tops. Some pieces have quite a reddish tinge, and it is difficult to make them harmonize with the rest. Certainly this might be partly eliminated in matching the article, but time will not permit too much care. Will some of your readers suggest something to help us?

Answer by W. J. Beattie

There is always this trouble to contend with in harmonizing the colour in fumed finish. One way, as suggested in the query, is to take some care in matching the plain oak tops (assuming that it is plain oak) in the machine room. The other remedy is to fume longer in the chamber, so that the ammonia will drive the stain well into the wood, which helps to equalize the colours. After the second coat of shellac has been applied, and before it has been sanded, equalize the colours by using a spirit mixture of brown and one of nigrosine in different vessels. This is put on with a soft flat brush, and must be applied in one stroke. The colour and quantity required are a matter of practice. After the article has been brought to as even a colour as possible it should be allowed to dry hard, then sanded, and the application of mineral wax wiped off completes the work.

* * *

Answer by Kenneth McGilvray

I have experienced much the same trouble with fumed oak, but now I am using an acid something like unifume before fuming, and this eliminates most of the trouble. There are several different makes of this acid, and most of them are patented. Some are good for one style of finish, and some for another. I have

no doubt that a little experimental work would disclose the most suitable.

* * *

Answer by Albert Hudson

The fuming box is gradually being installed, because undoubtedly it is the best way of producing fumed oak. However, a good deal of the trouble can be saved by matching the wood. In the fuming process considerable assistance can be had by the use of tannic and pyrogallic acid, in conjunction with the length of fuming the work. By increasing the acids you would decrease the length of fuming. In applying these acids the finisher would stint the amount he applies on the sap or discoloured wood, so that the piece of furniture when passed on to the fuming box would represent a nearly uniform amount of tannin to be subjected to the ammonia fumes. Good fumed oak can be produced by the aid of chemicals, aniline dyes assisting. The bichromate process is a good one. The wood is coated with an alkaline solution of bichromate of potash, usually in equal parts—an ounce of each to a gallon of water. This stands for about twenty-four hours before sanding. The alkaline coat is added to cause penetration and browning. The second coat is a brown stain. Some use acid brown—walnut brown, while others a brown made by mixing orange and black until the desired shade is obtained. The final colour should not be judged until a thin coat of shellac has been given. The groundwork of fumed oak, no matter how produced, is very much alike, and when there is any matching to be done, whether quartered or plain oak, the following method is recommended: Dissolve one-half ounce of Bismarck brown in a pint of alcohol, and add one pint of white shellac. In another pint of alcohol dissolve half an ounce of spirit black, to which add a pint of white shellac. We now have two solutions—a red and a black, the peculiarities of which are such that almost any shade and tone of brown can be produced, which when added to the shellac coat will make the required shading and tinting possible, and help the finisher to doctor spots and any light pieces, bringing out the desired uniformity.

* * *

Answer by J. G. Walker

Oak may be fumed evenly if treated in a proper fuming chamber, and by using liquid ammonia with a strength of 880. The colour may be made uniform by adding more ammonia as the wood becomes coloured.

* * *

Answer by R. Ferguson

Unless people devote time and care to the selection of their lumber for fuming they will never do much with their work. I have found that oak with a reddish tinge is not a success in fuming, so that it would be advisable to try bichromate of potash as a substitute, as it gives a fine fumed effect.

The U. S. Consul at Palermo, Italy, thinks there is a splendid opportunity for American manufacturers to develop a much larger trade in lemon box shooks (boards) with Sicily and Italy. Most of these shooks have come from Australia, and this source of supply having been cut off it makes a better chance for American goods.

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Chapter 4—*Methods in the Glue Room*
Chapter 5—*Glue Room Equipment*
Chapter 6—*Selection of Glue*

WOODWORKER PUBLISHING CO., LIMITED
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Woodworking Fires

A small amount of damage was caused by a recent fire at the sash and door factory of H. Chagnon and Company, 27 Burnett Street, Montreal. The fire, which started in the engine room, was confined mainly to the drying room.

The Hardwood Specialty Company's factory at Pembroke, Ont., which was destroyed recently by fire, is to be rebuilt on a larger scale. In regard to the shook mills owned by this company, it is stated that orders have been coming in so well of late that it has been found necessary to work overtime three nights a week in order to keep up the output. The company are negotiating a large war order.

A fire which occurred at the cabinet works of the G. H. Randall Company, City Hall Avenue, Montreal, on September 29, resulted in the destruction of a considerable amount of stock, including some furniture for the St. Michael's Church, Montreal. The fire started on the second floor of the two-storey building, and was speedily extinguished, although not before some stock was burned or damaged by fire and water. The loss was covered by insurance.

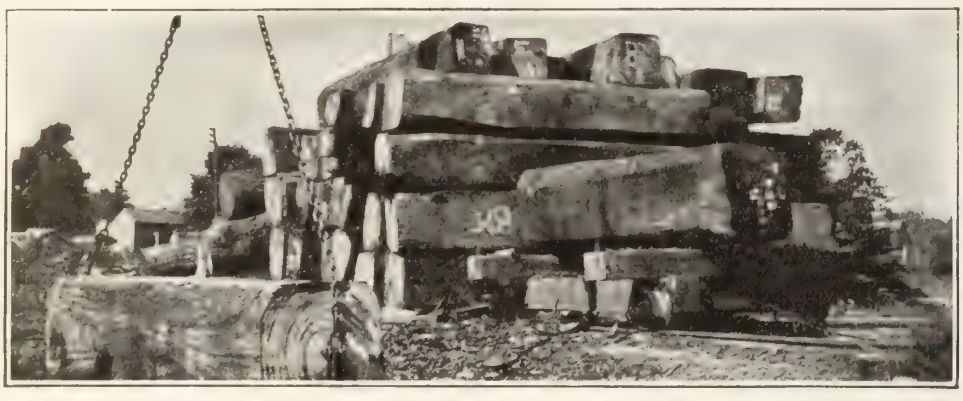
The Bathurst Lumber Company, Bathurst, N. B., suffered a serious loss by fire last month. The flames destroyed their dock lumber yard including about 15,000,000 feet of lumber valued at $250,000. The flames were discovered almost at their inception, but a fierce northwest gale spread the fire so rapidly that it could not be controlled. Fortunately the gale, which continued until the fire had burnt itself out, carried all the sparks out to sea. The splendid new dock was absolutely destroyed. The company carried between $600,000 and $700,000 insurance upon their plant and dock, so that the latter is well covered.

As a result of a fire on September 25 at the sash and door factory of Benoit & Sons, Amherst Street, Montreal, Joseph Laurion, Eugene Poirier, and Bonaventure Desjardins lost their lives, and Joseph Leveille was seriously injured. The fire originated near a planing machine on the first floor, and spread with such rapidity that the three men killed, who were on the second and third floors, were cut off as they attempted to escape. In the opinion of Mr. Benoit, the fire was caused by a spark from the planing machine due to friction. The factory, a three-storey brick building, was badly damaged. The three floors and the stocks of manufactured and raw material were destroyed, and the machinery was also seriously damaged. The walls and roof remain, although the latter was almost burned through. The estimated loss is $10,000, exclusive of machinery, with insurance of $18,000. The premises will be repaired.

New Industry for Brockville

If negotiations now under way materialize as expected, Brockville will benefit by the establishment of an important automobile industry in connection with The Canada Carriage Company, which is affiliated with Carriage Factories Limited, a merger of a number of factories engaged in the manufacture of vehicles. The parent concern is considering taking up the manufacture of a light, moderate priced automobile, and Brockville is spoken of as the probable place of manufacture. Mr. T. J. Storey, General Manager of The Canada Carriage Company, has been in New York City where the negotiations have been taking place.

The suggestion has been made that the timber arch erected in Stanley Park several years ago be called "The Bowie Arch," to perpetuate the memory of its designer, the late Capt. Bowie, of Vancouver, who met death in the trenches of France quite recently.



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Common Faults and Suggested Improvements in the Equipment of the Veneer Department

(Staff Article)

EVERY manufacturer who uses veneered or built-up stock has his problems and difficulties; indeed it is not saying too much to assert that no department in a woodworking plant is so prolific of trouble as the Veneer Department. The purpose of this article is to bring forward some of those points and improvements that have come under the notice of the writer—in the hope that they may suggest possible corrections in the departments of readers of this journal.

On many phases of veneering practice opinions differ, certain methods being suited to certain classes of work. This being the case it has been the endeavor to touch only on the most common faults or to bring forward such improvements that have been successfully tested in actual practice.

The first important factor in the production of good work is the business-like lay-out of the department, for on this depends the regularity with which the successive processes follow without interruption. The sketch plan illustrates what should prove to be a good veneer department.

It will be noticed that each machine is placed at a convenient distance from the other, and that adequate room has been made for the passage of trucks through the entire department—from the veneer store to the space reserved for truck-loads of finished goods. Conveniently placed, by the clippers, are the racks for short ends, which should be graded in various lengths to enable them to be utilized at the first opportunity.

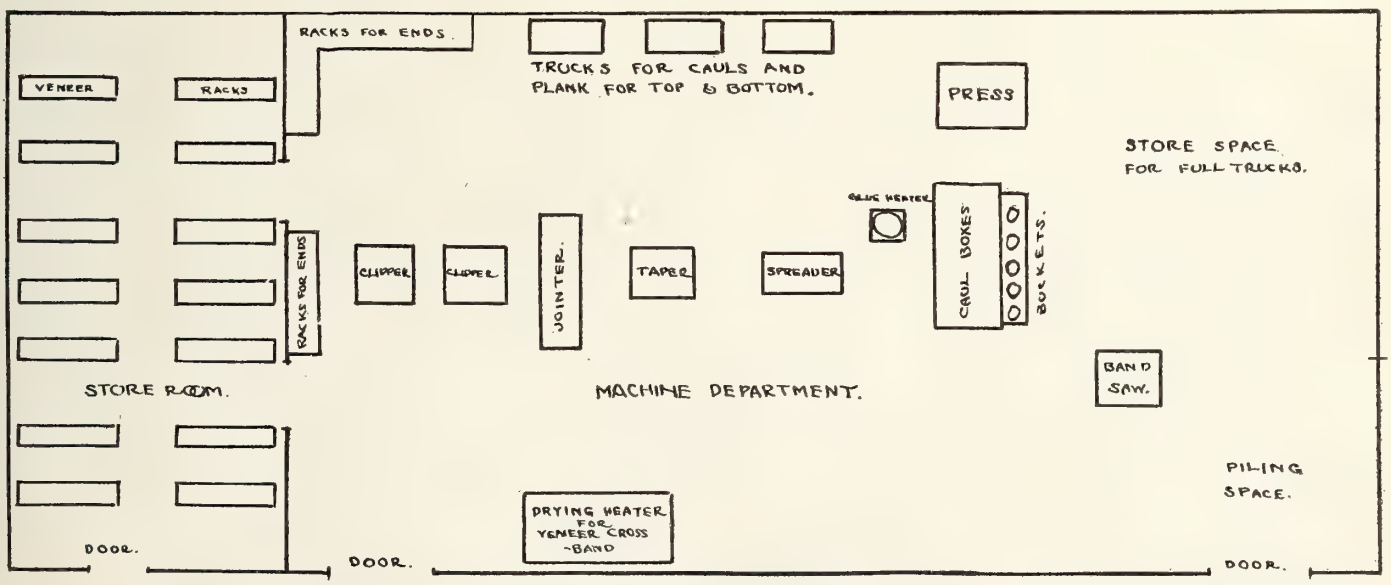
Abundance of good light is necessary the year round. The importance of this point it is impossible to over-emphasize—especially in the furniture factory, where careful matching is required.

Ranking in importance with good light is a constant supply of pure air; but care must be taken to avoid draughts, particularly in the vicinity of the glue spreader and caul boxes. An even temperature of not less than 80 degrees Fahr. should be maintained throughout the entire department.

Now let us consider the veneer store room itself. In order to keep veneers in good condition a certain humidity is required. This humidity is not possible in concrete or hard-wood floored store-rooms unless special provision is made. The only reasonable course to take in cases of this kind is to place pails or tanks of water at frequent intervals around the floor to provide the necessary moisture. The ideal and common-sense store-room should have a floor of beaten earth, with plank gangways for the trucks. Providing that the heat was kept uniform all troubles as regards humidity sufficient for the purpose would be at an end. This course is so reasonable that it is really remarkable that it has not been adopted more largely.

It can safely be said that if either of these methods were followed most of those fine checks which have an annoying habit of showing up after the finish is put on would be avoided. Briefly, one of the most common faults of veneer practice is the storage of stock in an atmosphere that is far too dry.

Another essential point is that all the cans, pots and glue spreaders should be made of copper in pre-



Suggested lay-out of veneer department.

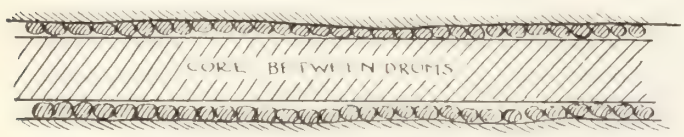
ference to galvanized iron. Most important of all they should be kept scrupulously clean.

Blisters are the nightmare of the veneer layer's life, and in regard to this I would like to call attention to one of the often-overlooked causes of this trouble: I refer to the rope-wound glue-spreader. When this type of spreader is new it leaves nothing to be desired, but unfortunately the rope and the underlying drum are acted upon by the glue to such an extent that the rope wears and lumps up, and the surface of the drum being out of reach so far as cleaning is concerned, it corrodes unchecked. The result of this action can best be explained by a diagram. Here we see that the cords in some cases have been pressed flat and in others have become enlarged by having glue forced into them, and also that the drum surface having corroded becomes uneven.

The result finds practical expression in faulty work in almost every veneer department of the trade. The glue, instead of being evenly spread upon the core, is applied too thickly on some parts and too thinly on others. The effect is that after the usual amount of glue has been absorbed by the core, certain patches are left dry—and there briefly is one of the principal causes of blisters.

The only solution of this problem is to have the drums of corrugated galvanized steel. These, while having superior wearing qualities as compared with the rope-wound type, can readily be kept clean.

Another factor in the consideration of blisters is the subject of cauls. All manner of cauls have their



adherents. Much is claimed for those made of galvanized iron or aluminum, but of all the cauls to be had, wooden cauls made correctly are the most satisfactory—at least with fine cabinet work. They should be made of three-ply stock with cloth between the sections. Made thus they will give just the requisite amount of "come and go" necessary to good work. Another point in favor, as compared with metallic cauls, is their ability to retain heat for quite a considerable period after being taken from the caul box. This class of caul is in common use in most of the English factories, and in quite a number of American factories, too, and it gives the greatest satisfaction.

Cleanliness is the watchword with cauls, as indeed it should be with the whole department. It is absolutely necessary to clean both face and edges in order to keep hard glue spots from pressing in and marking them.

As regards the press, the best is undoubtedly the hydraulic type. It is a good investment to get one for the department, for the work produced and the time saved soon balance up the little extra in cost. This, of course, is meant in regard to big factories: the hand type is adequate to the needs of the small shop.

Finally, let it be mentioned that the commonest mistake on the part of the manufacturers is the idea that good veneer work can be rushed through the department in a day or two. It cannot be done—at least not in good furniture work, where the quality should be of the highest. Taking the processes through from start to finish not less than four days should be allowed before the stock is transferred to the next department.

Redrying Veneer before Laying

By W. H. Homier

NOT every shop has sufficient work to justify the expenditure necessary to install a redrier. These shops are liable to overlook the importance of having veneer prefectly dry before being laid, says W. H. Homier, writing in Veneers. In shops where there is a lot of work and a redrier it becomes a matter of habit to redry the veneer. It is done so quickly and with so little inconvenience that it dovetails itself in as a necessary part of the operation to such an extent that one would no more think of laying the veneer without first redrying than one would think of laying it without matching.

But there are still a lot of shops that neglect this very important part of the veneering process, either because they do not fully appreciate its importance or because they do not know how to do it without an expensive machine. Many who do know better will, if they are somewhat rushed, take a chance on laying the veneer without any pretence of drying.

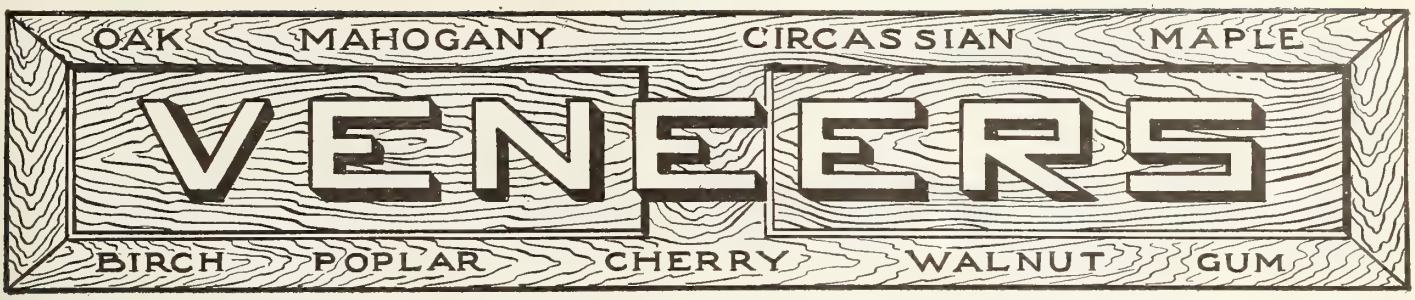
The writer recently had occasion to visit a shop that was experiencing considerable trouble with veneered work. They had been having trouble for a long time, but lately it had become worse. Formerly they had kept the veneer stored in a storeroom adjoining the cabinet room, but this was thought to be too dry and it was thereafter kept in the basement. Then their troubles began in earnest. Formerly the trouble was with fine checks, but now the checks were large, and many of them opened right up.

The veneer man could not understand it. Of course, his idea was that when the veneer was kept in the storeroom it checked when it got dry, and it puzzled him greatly to find it checking even worse when kept in a moist place where it could not dry out. He also assured us that he had for some time been trying the experiment of putting fewer pieces in the press to prevent them swelling, but the results were the same.

In carrying out a system so many people fail because they do not carry it out in its entirety. So often some little thing is left undone that spoils the whole thing. Of what use is it to rush veneered stock into the press that the moisture from the glue may not swell it, when it has already been swelled almost to its fullest extent by being permitted to absorb moisture in a damp basement? Had this man started to hustle his stock into the press at the time that he was keeping his veneer in the dry storeroom, his trouble with checking would have been overcome.

It does not make any difference when or where the veneer takes up the moisture, whether it gathers it from a moist atmosphere in the basement, whether it is sponged to straighten it out or whether it gets it from the glue before it is put in the press, the effect is the same, and results in expansion. If veneer, at the time it is laid, has already expanded as a result of moisture obtained from other sources, it will not expand much more by coming in contact with the glue. It is dry veneer that expands, and it is this veneer that should be hustled into the press before it gets a chance to swell.

Don't be afraid to have your veneer good and dry. It may be easier to handle when it is moist and soft



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and pliable, but to lay it in that condition means no end of trouble in the future.

If you must keep the bulk of your veneer in the basement or some other place that is not very dry, you can keep your requirements for a few days ahead in some place where it can dry. Perhaps you have a drying room where you keep your veneered stock after taking from the press. Make a rack with arms from near the floor to the ceiling. Have these arms quite close together up and down, and not more than two feet apart horizontally. Place the sheets of veneer across these arms singly, and, being very thin, they will soon dry out. If the drying room is well heated and ventilated and plenty of time can be given to dry, several sheets may be laid together on the arms. But if you are short of time, put them in singly.

Ordinary plain veneer seldom, if ever, requires any straightening out. It is the fancy figured stuff, with the grain of the wood running in every imaginable and conceivable direction, that buckles into so many shapes. This stuff must be straightened out before it can be laid, otherwise it will break into pieces like so much china when put under the press.

The factory of which I have been speaking had a large mahogany office desk, the drawers of which were veneered with crotch, but a worse lot of checks I have never seen. The veneer man, when questioned as to how he did the work, said that the crotch veneer was very dry and badly buckled (it was done while they kept the veneer in the store room), and to keep it from smashing into fragments when under the press he had soaked it in water, then spread it out for the surplus to drain off, and laid it while yet soft and pliable.

Had the man taken these sheets of crotch, and, after allowing the water to drain off and while they were yet soft and pliable, placed them singly between boards of a soft, absorbent nature, and put them in the press for a while, this trouble would have been avoided. Boards for this purpose should be very absorbent and have every particle of moisture extracted from them. They should be heated just as hot as steam pipes can heat them, which means that the average man cannot handle them with the bare hands. This is necessary in order to thoroughly extract in the quickest possible time all the moisture from the veneer. After a few hours it may be taken from the press, when it will be perfectly dry and straight and ready to lay.

The Pacific Box Company, Vancouver, B. C., recently entertained the members of the B. C. Consumers' League to a factory reception. There was a good sprinkling of ladies, who were particularly interested in watching the various machines used in the work. The visitors were shown the various processes through which spruce lumber, with hardly a touch of human hands, is sawed and smoothed, assembled, printed, and nailed into soap, fish, and fruit boxes. The Manager, Mr. H. Sharpe, stated that the company had two and a half million feet of spruce in the yard, and that the lumber piles, which covered three acres, constituted a supply for four or five months. The Pacific Box Company is endeavoring to develop an export trade with Australia and South America. Negotiations are now pending with buyers in Peru.

William R. Perrin, Limited, have recently installed a 200-ton veneering press in the Hay & Co. plant at Woodstock, Ont. This is the second large press which has been installed in this plant by the William R. Perrin, Limited.

News of the Trade

The Spiesz Furniture Company, of Hanover, Ont., have received an order from the Dominion Government for ten thousand sixty-pound shell boxes.

Mr. H. O. Bell, Manager of the Bell Furniture Company, of Southampton, Ont., is reported to have obtained a contract for a considerable number of shell boxes.

A pleasing feature about the shell box business is that it goes to some of the smaller towns. Jones Brothers, of Dundas, for instance, recently obtained a contract for fifty thousand boxes.

A planer, weighing about fourteen tons, was recently consigned to the factory of the D. McKenzie Machinery Company at Guelph, and has been installed for the purpose of carrying out special heavy work.

The J. H. Preston Planing Mills Company, of Medicine Hat, Alta., have in hand a large order in the shape of a contract for 12,500 hardwood packing cases. The manager of the plant is Mr. E. E. Fletcher.

At St. Thomas, on the last day of September, the warehouse of the Rodney Woodenware Company was destroyed in a fire supposed to have been started by an incendiary. The loss was about $5,000, partly covered by insurance.

Messrs. McQuarrie & McDonald, of Stellarton, N. S., are reported to have secured an order for the manufacture of ten thousand shell boxes. It is stated that they will install the necessary machinery for the handling of the contract.

Messrs. Rhodes, Curry & Company, whose works were destroyed by fire last October, have resumed operations in a new plant which represents the expenditure of some $7,000 or $8,000. The proprietors are Messrs. N. A. P. Rhodes, N. Curry, and Mark Curry.

The Mosart Sales Company, Limited, is a newly incorporated Toronto firm organized to carry on trade as manufacturers of and dealers in musical instruments, furniture, and so on. The incorporators include H. A. Hall, J. J. Flint, and H. R. Moses, all of Toronto.

The Bain Wagon Company, Woodstock, Ont., intend to run their factory on full time again. In some of their departments it is expected that overtime will be necessary. A large order for Bain wagons and sleighs, received from the North-West, is largely responsible for this.

The Goderich Organ Company, Limited, Goderich, Ont., were recently awarded the contract for 10,000 shell boxes, and the company is anticipating further orders along this line. The boxes are to be of different design from those being made by the Paget Company, and will contain but two shells of the 6-lb. calibre.

The Beach Furniture Company and the Lally Lacrosse Manufacturers Company, Cornwall, Ont., have started operations on their contracts with the Dominion Government for the supply of fifty thousand ammunition boxes. About seventy-five hands will be employed on the shell boxes alone. Besides this, some fifty people will be kept working at their homes, splicing the rope handles for the boxes.

Among the carload of woodworking machinery which recently arrived for the Baechler Furniture Factory at Goderich, Ont., and which has been placed in the new building, were several surface planers of various widths and with single and double cut. Though some of the various machines have not yet been placed in position, rip-saws, cut-off saws, band-saws and trim saws are already in operation, together with

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a sticker for dressing and matching light lumber, these being at present operated from a temporary shaft driven by the engine which operates the saw mill. The permanent shaft will be connected with a new 100 h.p. Wheelock engine of Goldie & McCulloch's make. Lately the factory has been busy at work on a large order for the consignment of crates for packing canned goods.

During a heavy storm at Pembroke, Ont., a fire recently broke out at the plant of the Hardwood Specialties Company. Fortunately the whole of the loss was covered by insurance, amounting to the sum of $15,000, though it has meant the discharge of between forty and fifty men until the company completes the rebuilding of the factory, to be started as soon as the insurance adjustment is made.

It is stated that a re-organization of the whole of the Bell Piano Company's business is to take place. The piano section of the factory at Guelph has recently been closed down, though there are still a few men employed in the organ department filling some Old Country orders. Mr. Grimdick, secretary of the company, is on his way from England with a view to taking charge of the company's affairs.

Business conditions in high-grade woods are excellent, according to the report of The Dominion Mahogany and Veneer Company, of Montreal, importers of tropical woods, and manufacturers of all kinds of mahogany in lumber and veneers. Mr. G. Kersley, the general manager, states that during the last month or so the company have benefited by the biggest record sales since they opened up their factory, and their mill is running under normal trade conditions.

Mr. James Lindsay, well known in the furniture manufacturing trade in Woodstock, is leaving that city for Toronto after a long business connection. He was born at Belfast, Ireland, and started in the furniture business in a small way at Woodstock nearly twenty years ago, since when he has built up an excellent business. When Mr. Lindsay first arrived in Woodstock he secured a position as cabinet-maker with the late James Hay, by whom he was sent to Hoboken, N. J., to acquire a thorough knowledge of rattan work. Subsequently he returned to Woodstock.

With an order for 10,000 fish boxes the newly installed plant of the Laminated Materials Company in Sapperton, a suburb of New Westminster, is now in operation and turning out some six hundred boxes a day. Arrangements are being made to install new machinery and greatly increase the output to keep pace with the demand. These boxes are made from cottonwood and when complete weigh only four pounds, as opposed to the eleven pounds weight of the ordinary wooden fish box. This light weight more than offsets the increased cost of 3½ cents per box, particularly for long distance shipments. Though light the boxes have been proved to stand up well under hard usage, due to their peculiar construction. The company have some $50,000 invested in the machinery for the plant.

Mr. A. P. Willis, the well-known Montreal piano manufacturer, has been making a trip of inspection of the firm's numerous agencies throughout the Dominion. He arrived recently at Victoria, B. C., and while there stated that plans were under way for the formation of a new subsidiary company to do business in the province and have its headquarters in the capital. Mr. Willis is the President of Willis & Company, Limited, an old-established Montreal firm. He is also President of the Willis Piano Company, Limited, whose factory is at Ste. Therese. The capacity of this plant is stated to be five thousand instruments a year. Following his observations in the course of his trip, Mr. Willis was optimistic as to coming improvement in the state of trade. He had noticed, he said, that all the centres which had a good agricultural community behind them were feeling the effects of good crops. The firm's branches had been doing well, and were ordering goods freely.

In "The Bone Book," a publication received from Messrs. Pratt & Lambert, Inc., there is contained a particularly engaging account of the adventures of twelve salesmen who were successful in a European Trip competition instituted last year with a view to increasing the company's sales. The trip abroad was offered to the salesmen making the best sales records for the first six months of 1914. The narrative sets forth the adventures of the twelve tourists from the time they left New York on July 2nd until their return in the second week of August. It tells of their escape from war-ridden Europe on the memorable trip of the Mauretania when she broke the trans-Atlantic record in four days and ten hours—the fastest trip ever made across the ocean. The book is well illustrated, and is a unique and interesting souvenir.

Manufacturers of sawmill and woodworking machinery may be interested in Trade Inquiry No. 831, which has been received from Mr. Harrison Watson, Trade Commissioner at London, notifying the Department of Trade and Commerce at Ottawa of the name of a firm who are large manufacturers of sawmill and woodworking machinery. As their own plant is heavily engaged in Government work, and they are receiving inquiries from all parts of the world which they cannot deal with themselves, they are prepared to receive complete information from any Canadian manufacturers of sawmill and woodworking machinery, enabling them to negotiate for orders without being obliged to refer any further to Canada. They wish to be placed in the same position as the manufacturer would put his traveller or agent. Canadian manufacturers wishing to avail themselves of such an opportunity may be supplied with the name of the firm by applying to the Department of Trade and Commerce, Ottawa. (Refer to File No. 810).

The Annual Conference of the representatives of the Canada Carriage Company, Brockville, Ont., was held recently. The attendance roll was signed by upwards of fifty. After an inspection of the factory, which was conducted under the direction of the Superintendent, Mr. J. Sizelan, the visitors sat down to a business conference presided over by Mr. T. J. Storey, President and General Manager of the company. The day following the conference was spent on the River St. Lawrence, on the steamer "Cecilia S." Throughout the day a band from the company's staff played patriotic and other airs at frequent intervals. On reaching Rockport an excellent lunch was served, after which the party proceeded to Gananoque, and visited the factory of the Canada Wheel Company. The last point touched was Alexandria Bay, where dinner was served. Mr. D. M. Spaidal, Vice-President and Assistant General Manager of the company, was unable to be present owing to the death of his brother.

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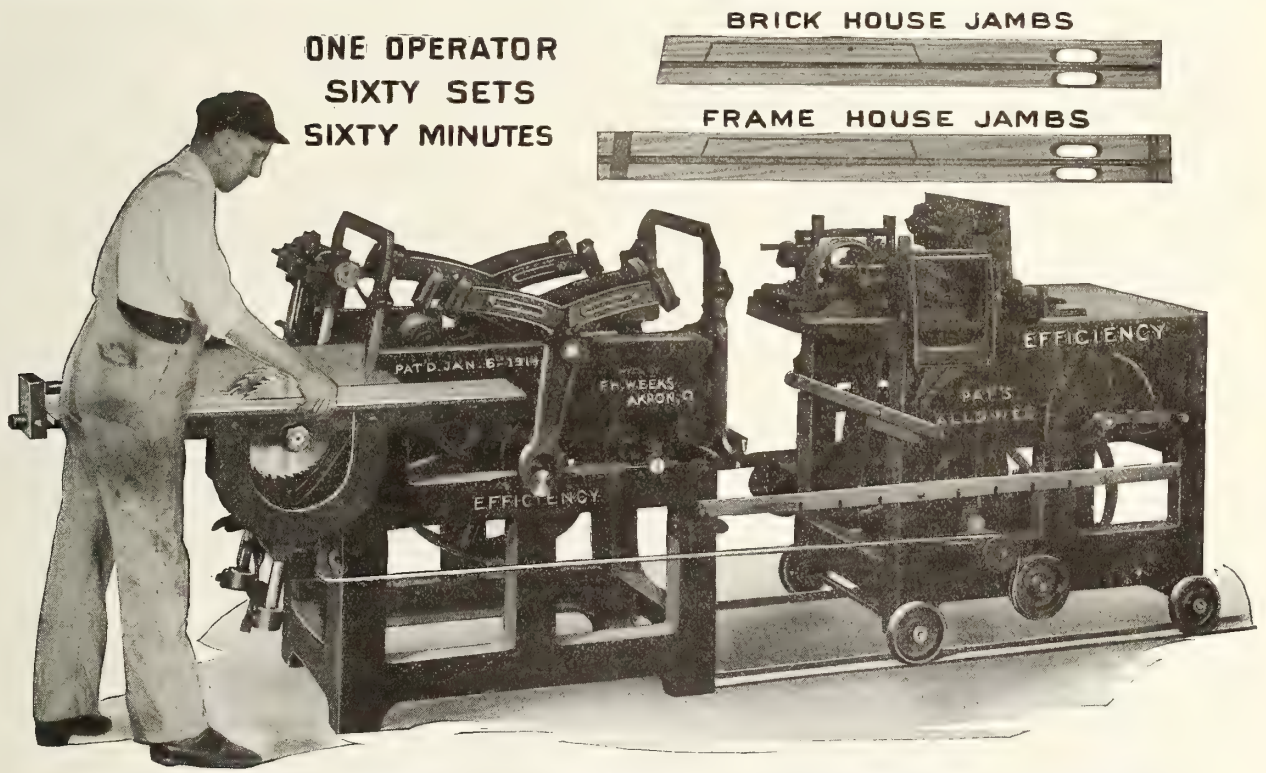

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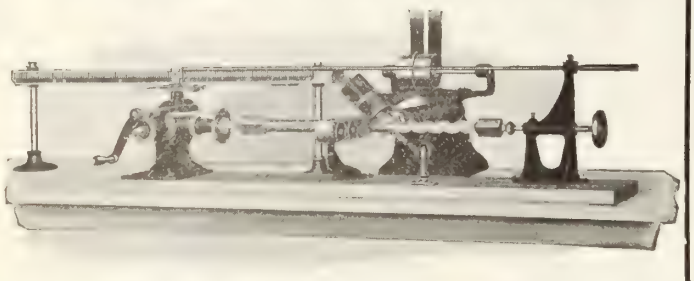

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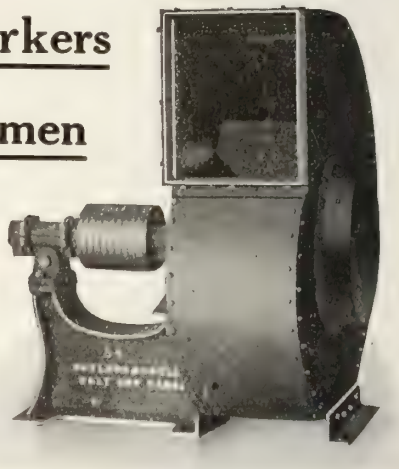

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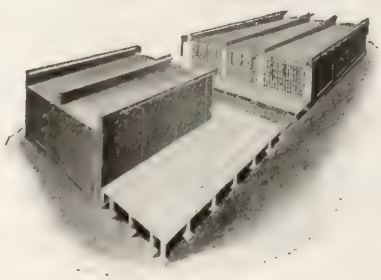

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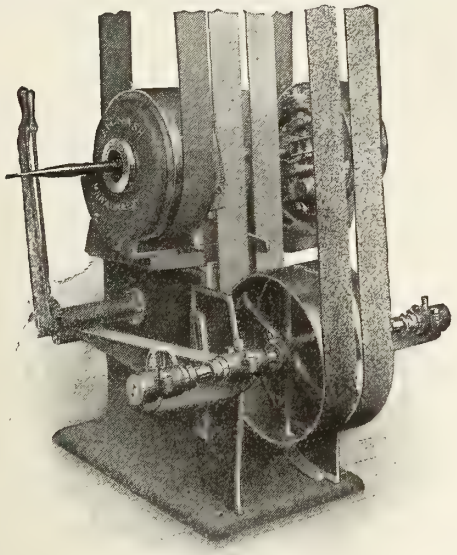

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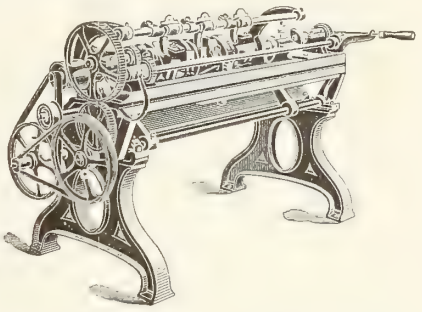

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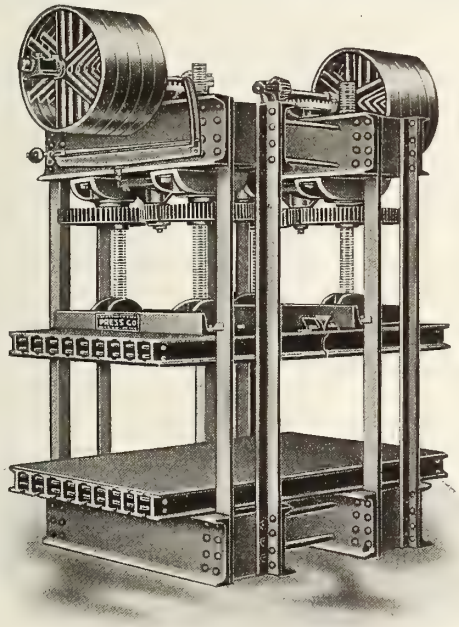

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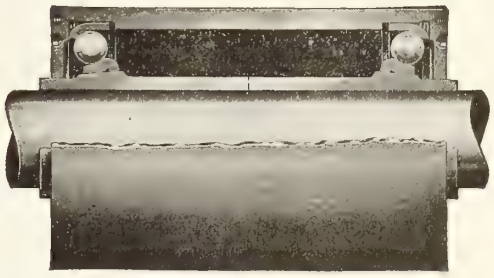

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FLUTING AND TWIST MACHINE
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

FURNITURE TRIMMINGS
Foster, Merriam & Co., Meriden, Conn.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.
Delany & Pettit, Limited, Toronto, Ont.

GRAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto, Ont.

GLUE
Coignet Chemical Product Co., New York, N.Y.
Delany & Pettit, Limited, Toronto, Ont.
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Jackson, Cochrane & Company, Berlin, Ont.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

GLUE JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Jackson, Cochrane & Company, Berlin, Ont.

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Berlin, Ont.

GLUE ROOM EQUIPMENT
Boomer & Boschert Company, Montreal, Que.
Perrin & Company, W. R., Toronto, Ont.

GLUING CAMP CARRIERS
Billstrom, Nels. J., Rockford, Ill.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio.

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Shimer & Sons, Samuel J., Galt, Ont.

GUARDS (Saw)
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

HANDLE THROATING MACHINE
Klotz Machine Company, Sandusky, Ohio.

HANDLE TRIMMING MACHINE
Klotz Machine Company, Sandusky, Ohio.

HANDLE & SPOKE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Co., Sandusky, Ohio.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitby & Son, Baxter D., Winchendon, Mass.

HARDWARE SPECIALTIES
Reflector & Hardware Mfg. Co., Chicago, Ill.

HARDWOOD LUMBER
Atlantic Lumber Company, Toronto.
Duhlmeier Bros., Cincinnati, Ohio.
Kraetzer-Cured Lumber Co., Moorehead, Miss.
Luehrmann Hardwood Lumber Co., St. Louis, Mo.
Mowbray & Robinson, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Powell Myers Lumber Co., South Bend, Ind.
Prendergast Company, Cincinnati, Ohio.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Knechtel Bros., Limited, Southampton, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

KNIVES (Planer and others)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Klotz Machine Company, Sandusky, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Whitney & Son, Baxter D., Winchendon, Mass.

MACHINE KNIVES
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MITRE MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MOULDINGS
Knechtel Bros., Limited, Southampton, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PAINTS & VARNISHES
Marietta Paint & Color Co., Marietta, Ohio.

PATENT SOLICITORS
Dennison, H. J. S., Toronto, Ont.
Lightfoot, Stanley, Toronto, Ont.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Shimer & Sons, Samuel J., Galt, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

PRESSES (Veneer)
Black Bros. Machinery Co., Mendota, Ill.
Jackson, Cochrane & Company, Berlin, Ont.
Perrin & Co., Wm. R., Toronto, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

RESAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

RIM AND FELLOE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Duplex Moulding Sander Co., Hornell, N.Y.
Elliot Woodworker Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SASH, DOOR & BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Shimer & Sons, Samuel J., Galt, Ont.

SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SAW GUARDS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Knechtel Bros., Limited, Southampton, Ont.
Pryibil Machine Company, P., New York.

SAW JOINTERS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SCRAPING MACHINES
Whitney & Sons, Baxter D., Winchendon, Mass.

SCROLL CHUCK MACHINES
Klotz Machine Company, Sandusky, Ohio.

SCREW DRIVING MACHINES
Reynolds Pattern & Machine Co., Moline, Ill.

SCREW DRIVING MACHINERY
Reynolds Pattern & Machine Works, Moline, Ill.

SCROLL SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.
Simonds Canada Saw Co., Montreal, P.Q.

SECOND-HAND MACHINERY
Pryibil Machine Company, P., New York.
Williams Machinery Co., A. R., Toronto, Ont.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pyribil Machine Co., P., New York.
Shawver Company, Springfield, O.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Invincible Blow Pipe Company, Toronto, Ont.
Sheldons Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.

SPRAYING APPARATUS
De Vilbiss Mfg. Co., Toledo, Ohio.

STAINS
Marietta Paint & Color Co., Marietta, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass.

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Co., Chagrin Falls, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

TRUCKS
Standard Dry Kiln Co., Indianapolis, Ind.
Sheldons Limited, Galt, Ont.

TURNINGS
Knechtel Bros., Limited, Southampton, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Whitney & Sons, Baxter D., Winchendon, Mass.

UNDER-CUT SELF-FEEDING FACE PLANER
Fay & Egan C., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

VENEERS
Central Veneer Co., Huntington, W. Virginia.
Evansville Veneer Co., Evansville, Ind.
Hay & Company, Woodstock, Ont.
Hoffman Bros. Company, Fort Wayne, Ind
Huddleston-Marsh Lumber Co., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Robbins Veneer & Lumber Co., Buffalo, N. Y.
Waetjen & Co., Geo. L., Milwaukee, Wis.
Whisler, C. L., Hillsboro,' Ohio.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEERED PANELS
Hay & Company, Woodstock, Ont.

VENEER PRESSES (Hand and Power)
Canadian Boomer-Boschart Co., Montreal, Que.
Jackson, Cochrane & Company, Berlin, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD TURNING MACHINERY
Berlin Machine Works, Ltd., Beloit, Wis.
Shawver Co., Springfield, Ohio..

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Jackson, Cochrane & Co., Berlin, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

WOOD SCREWS
Robertson & Company, P. L., Milton, Ont.

WOOD SPECIALTIES
Knechtel Bros., Limited, Southampton, Ont.

WOODWORKING CUTTERS
Galt Knife Company, Galt, Ont.

YELLOW PINE
Prendergast Company, Cincinnati, Ohio.

DOWELS

Plain and Spiral Grooved

Our fifteen years' experience in this line at your disposal.
Let us send you prices.

WE ALSO MANUFACTURE A FULL LINE OF

Embossed and Carved Dentil Mouldings, Turnings and Balusters

We will be pleased to furnish information and prices on your requirements.

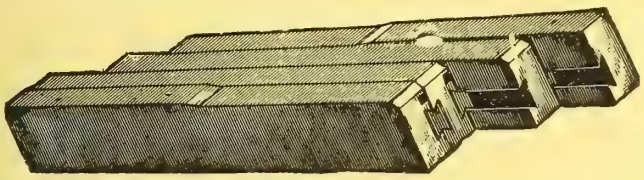
KNECHTEL BROS., LIMITED

SOUTHAMPTON - - - - ONTARIO

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively.

Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

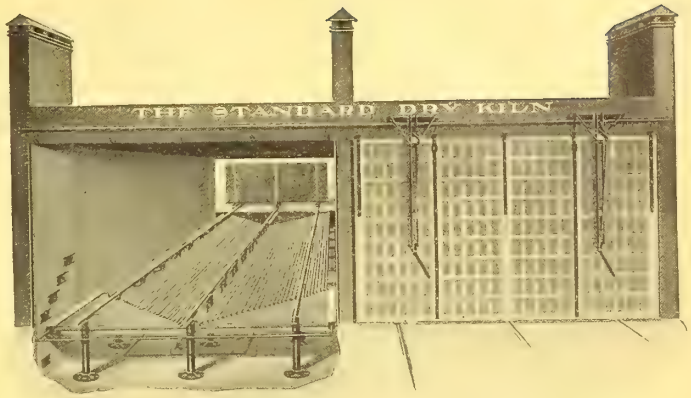
MADE BY

B. Walter & Company

Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887



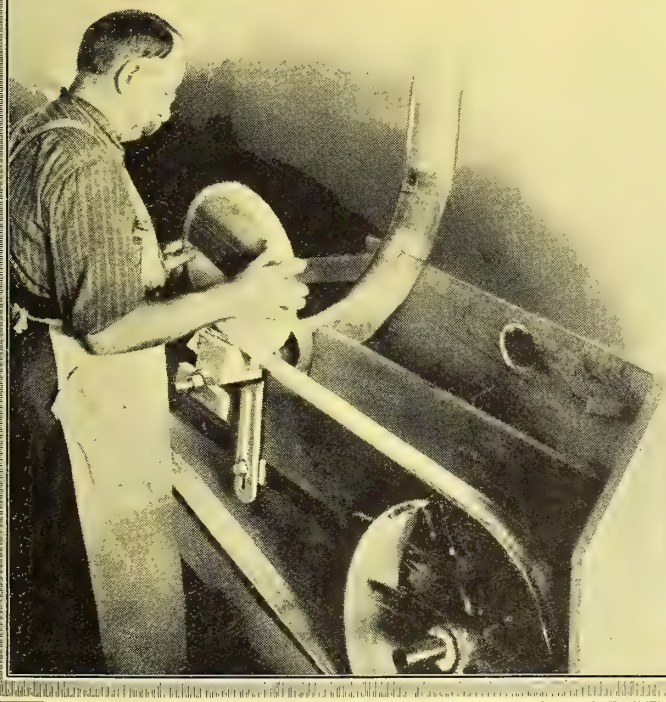
Look Out for Winter!

DON'T let freezing temperature catch you again with the same troublesome old heating apparatus in your dry kiln! Even if you're not ready for a complete new drying plant, let us figure with you **now** on installing

The Standard Heating System

in your present dry kiln. This system is **self-draining.** It doesn't need special attention, no matter how cold the weather gets. All expansion pipes are **horizontal.** There is no drop at either end of the system to pocket the condensation and stir up trouble. Write for an estimate. Address: The Standard Dry Kiln Company, 1560 McCarty Street, Indianapolis, Ind.

An Evidence of the Flexibility of Carborundum Brand Garnet Cloth



THE operator is sanding the curved edges of seats. He has a curved block across which his belt of cloth travels. The seat edge forces the cloth into the groove in the block, but the cloth is so flexible that it curves around the seat edge without cracking or breaking—of course, the grains stay on and the belt cuts clean and fast and uniformly.

It is characteristic of Carborundum Brand Garnet Products to do better, faster and more work.

Sample sheets upon request

THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.

New York Boston Grand Rapids Cleveland Cincinnati
Pittsburgh Philadelphia Milwaukee Chicago
Manchester, Eng. Dusseldorf, Ger.

For a Good Finish

A genuinely **practical** job; that will be a never failing source of satisfaction to manufacturer, dealer and final purchaser, use

Marietta SPARTAN ART WOOD STAINS

"The stains made with brains."

Ask the practical finisher for his candid opinion.

Write for particulars about our NEW JACOBEAN STAIN.

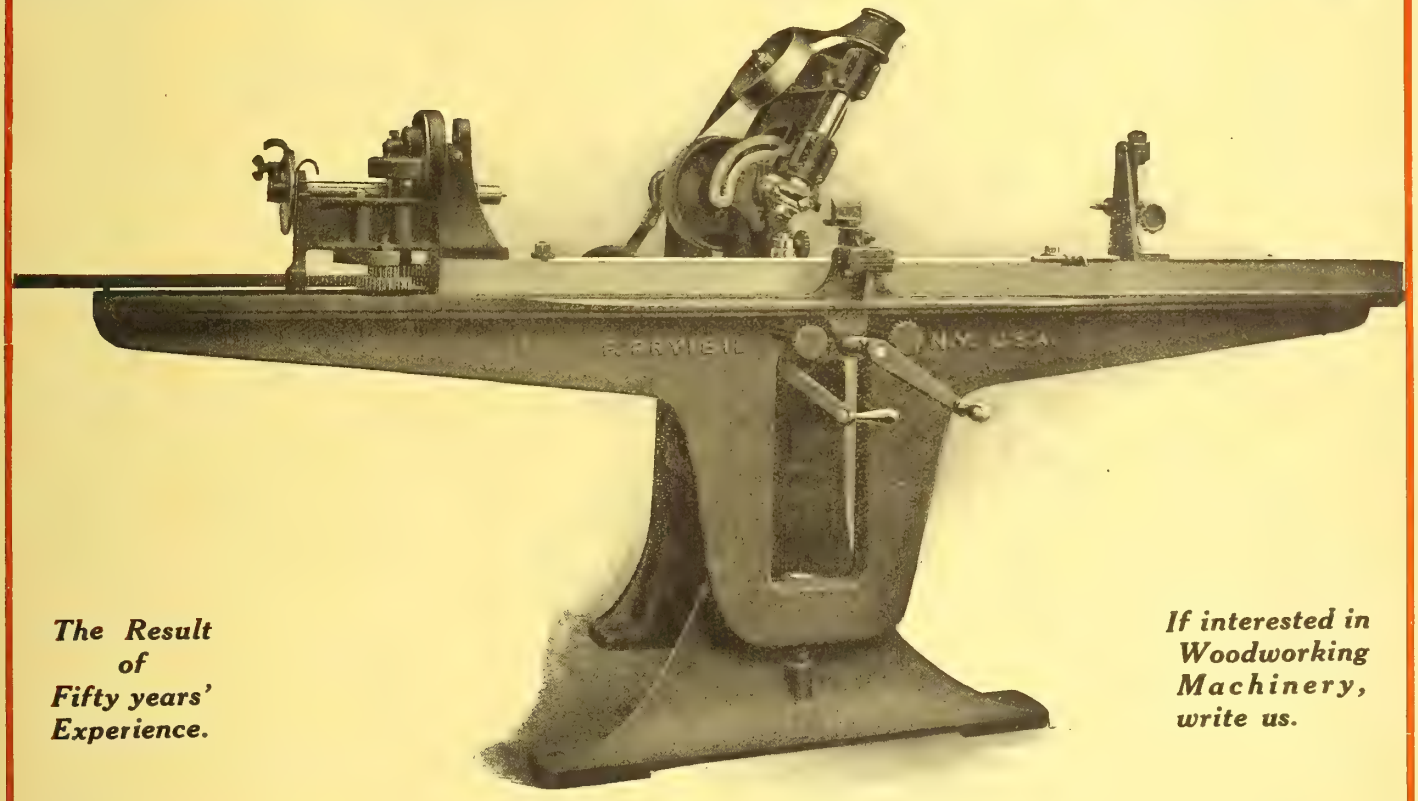
It has been thoroughly tested and can be relied upon absolutely.

The Marietta Paint & Color Co.

MARIETTA, O.

CANADIAN WOODWORKER and Furniture Manufacturer

Jacobean Twist Work



The Result of Fifty years' Experience.

If interested in Woodworking Machinery, write us.

This machine will produce all kinds of spiral or rope mouldings, either straight, tapered, curved or oval. It will make right, left, and pineapple cuts and will do straight and irregular fluting. It will cut from one to six threads on a piece, and will make any degree of twist from one turn in one and one-half inches of length to one in ten and one-half inches.

The cutters are similar in shape and arrangement to those used on variety shapers, and are made of the same steel. They revolve always in the same direction, whether the twist be right or left, and one set will produce several different shapes of work. Changing from one degree of twist to another, or from right to left, takes less than one minute. This machine will swing eight inches, and will take 5 feet to 10 feet between centres, according to length ordered.

A Medallion Fluting Attachment will produce radial fluting on flat work up to 9 inches square, or 6 x 12 oblong.

P. Pryibil Machine Co. 512-24 W. 41st. St. New York City

Alphabetical Index to Advertisers, Page 8

"Leather like gold has no substitute."

"CROWN"

Planer Belting

THE SUPREME TEST

for a leather belting is to run it on a planer or matcher. Such machines necessitate the belt taking short turns at high speed over small pulleys and at the same time carrying a heavy load.

To do this with the maximum of efficiency you need a strong and extremely pliable belt—above all, one which has a pulley-gripping surface. Few belts can satisfy this need. The "Crown" Planer Belting is one of the few

"Crown" Planer Belting is made from leather which is carefully selected, no weak spots being used. As for tanning, our name is sufficient guarantee

Sadler & Haworth

Tanners and Manufacturers

Toronto 38 Wellington St. E.
St. John, N.B. 189 Prince William St.
MONTREAL 511 William St.
Winnipeg Galt Building
Vancouver 217 Columbia Ave.

Shell Box Lumber

Dry Birch

WE have in stock approximately three (3) million feet of 4/4-8/4 and 12/4 Birch sawn during seasons of 1913-1914 and 1915. This is particularly suitable for manufacturing and Box purposes being sawn partially square and partially live edged.

We have extensive Kiln Drying, Resawing and Dressing Plants and can work to order.

Dry Spruce Boards

We carry the largest and best assorted stock in Canada.

SEND US YOUR INQUIRIES.

John Fenderson & Co., Inc.

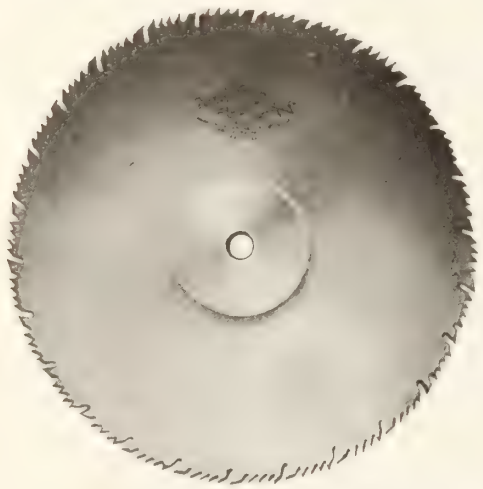
Sales Office:
Springfield, Mass.

Saw Mills, Storage Yards and Planing Mills:
Sayabec, Que.

Send to the Battlefield
Shell Boxes made in Canada
and sawn by Saws made in Canada—

SIMONDS SAWS

at our Montreal factory are made of every description and for all purposes—



Circulars
Wide Bands
Narrow Bands
Grooving
Lock Corner Cutters
Mitre Saws
Novelty Saws

In addition to this unexcelled line of saws of highest quality we make all kinds and sizes of Planer and Moulder Knives.

Write today for catalog and prices.

Simonds Canada Saw Co., Limited

St. Remi St. and Acorn Ave., Montreal

St. John, N. B. Vancouver, B. C.

4. We are not interested in any sanders now, but send us the book for our files.

Remarks.....

.....

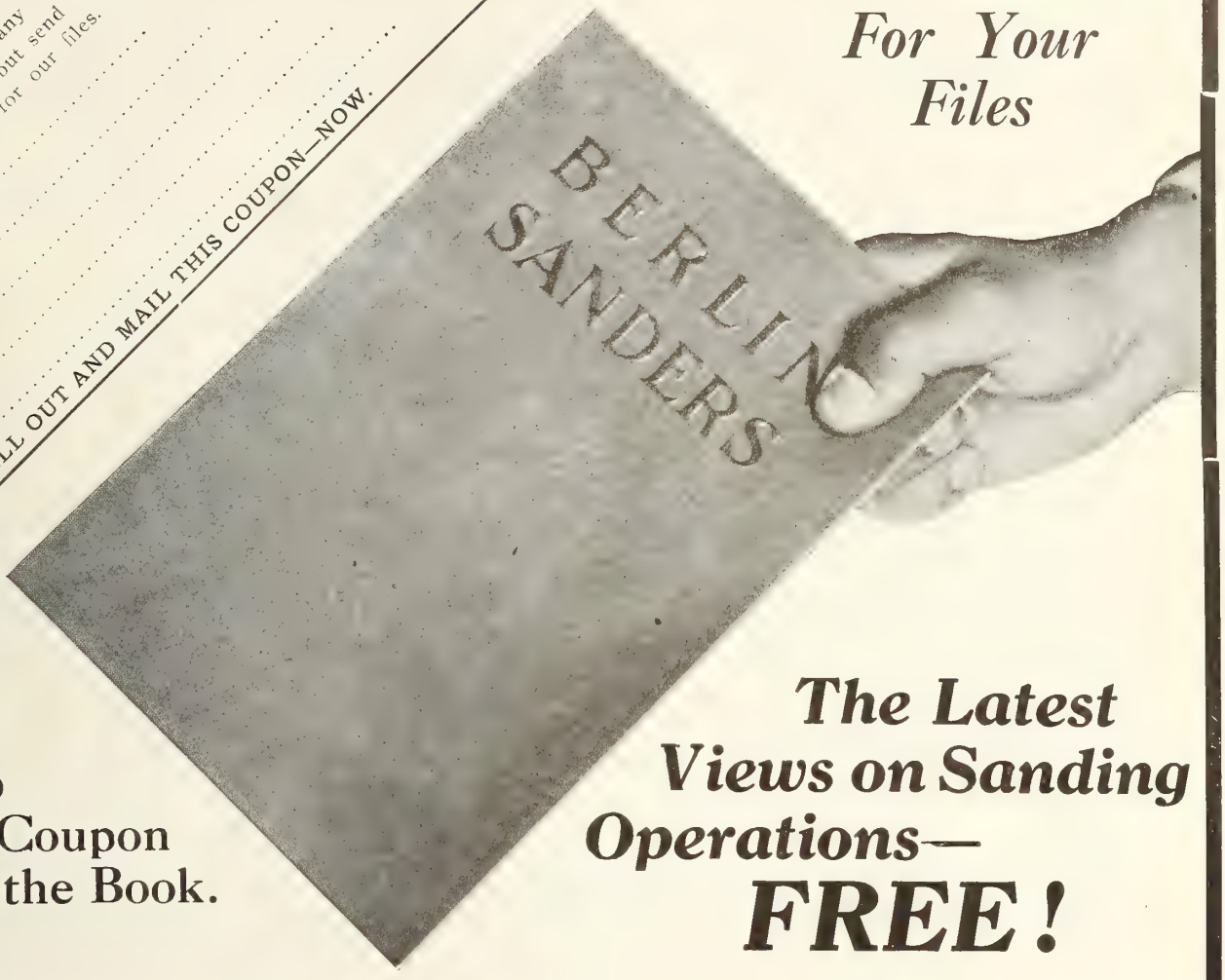
Name.....

Address.....

For Mr. .....

FILL OUT AND MAIL THIS COUPON—NOW.

For Your Files



Clip the Coupon Get the Book.

The Latest Views on Sanding Operations— FREE!

***48** pages of the most interesting and instructive information ever compiled on this important finishing method.*

For the convenience of you who give close attention to every sanding operation and the machines best adapted for your particular work and conditions, this book will offer invaluable suggestions.

No one type of sander is suitable for all classes of work. The peculiar size and shape of your particular stock may best be handled with greatest economy and perfect workmanship on the latest Roll-feed Sander, either with one, two, three, four or six drums.

Then again, an Endless-bed feed may best serve your purpose. Or perhaps a Flexible-belt Sander may save considerable by finishing such work as you can now only do by hand.

Each type of Berlin Sander is adapted for a definite purpose, yet all "overlapping" one another in usefulness to insure highest efficiency of operation on the work in hand.

To judge such usefulness requires first-hand information. The book above supplies a definite knowledge.

THE BERLIN MACHINE WORKS, LTD.
Hamilton, Ont.
U. S. Plant, - Beloit, Wis.

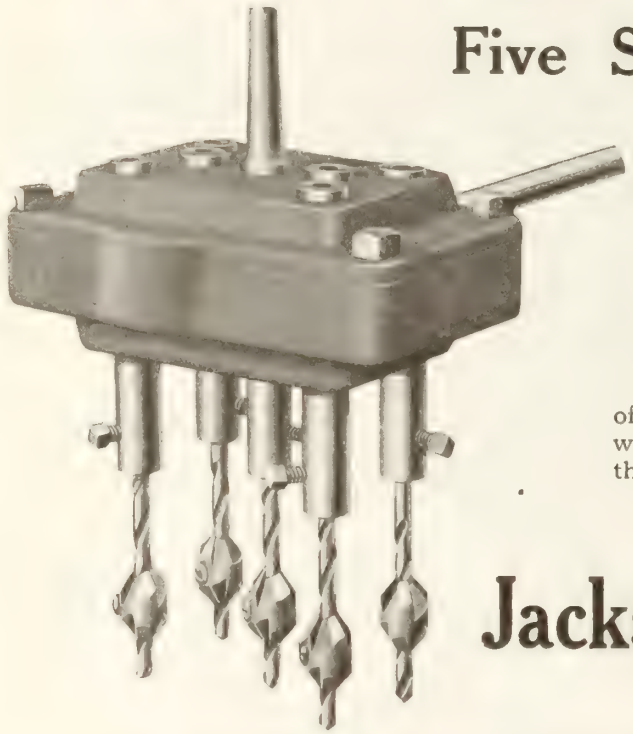
Our Service Department is in position to supply you, without expense or obligation, with data on the latest sanding methods used in every kind of factory where sanders are used. Why not avail yourself of such help?

MADE RIGHT—RIGHT IN CANADA

Berlin

A Short Cut for Shell Boxes

Five Spindle Boring Head



This head is designed for boring and countersinking the holes in the Handle Cleats of Ammunition Boxes in one operation. The Spindles are of steel and are operated by steel gears, which are inside of the cast-iron case. This head can be fitted on either a Vertical or Horizontal Boring Machine and has a capacity of 15 cleats per minute.

Another successful short cut in the manufacture of shell boxes. This is only one of several machines we are making which can be used profitably for the manufacture of shell boxes.

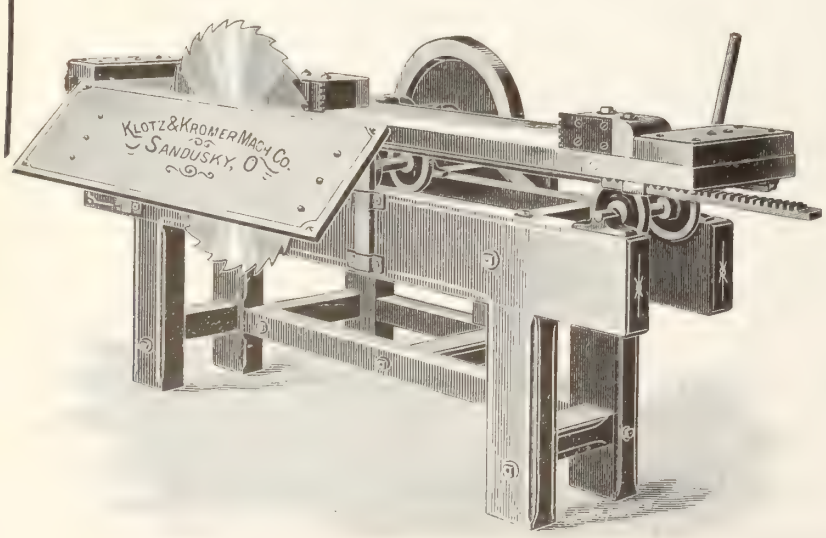
Prices will be promptly furnished upon request.

Jackson, Cochrane & Co.

Berlin, Ontario

Here It Is!

The Shaping Saw Machine That Saves Time



THE Klotz Shaping Saw Machine is specially made and designed for cutting out Shapes or Blanks for Handles, Spokes and similar work, from planks or slabs after they are cut from the log.

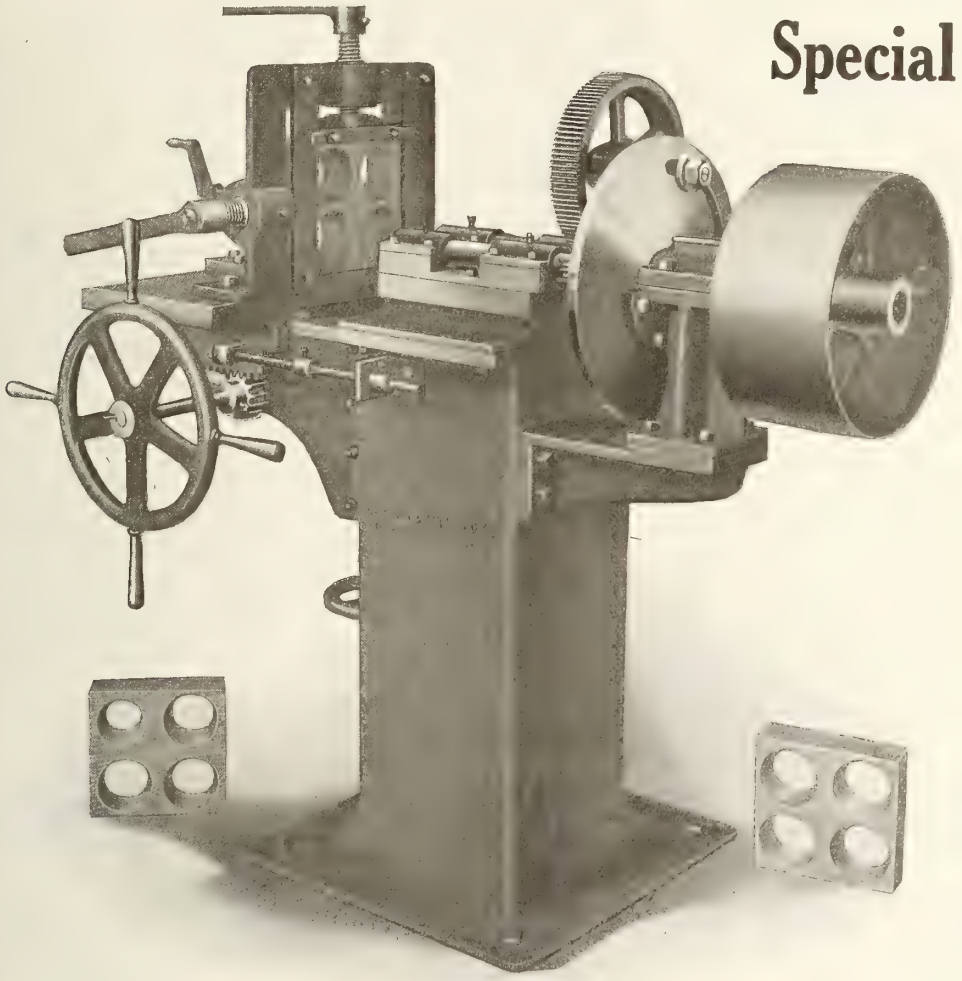
The frame is made from hard wood and firmly bolted together. The table is made of well-seasoned ash strips, glued together, and runs on large turned rolls, with wrought iron axles and metal bearing. A chuck is attached to the table for holding the timber; the same is adjustable for different lengths of work, and is very quickly operated by a suitable handle. The mandrel is of steel, and the balance-wheel is turned so as to run perfectly true. The drop-table is arranged so that it may be easily lifted out of position, in order to get at nut on mandrel to take off the saw. The saw furnished with the machine is 26 inches in diameter, and pulley on mandrel is 8 inch diameter, 6½ inch face, and will make about 1400 revolutions per minute. Power required, 2 H.P. Shipping weight 900 lbs. Floor space 4 x 7 feet.

Write us for prices and details.

Klotz Machine Co.

Sandusky, Ohio

Shell Box Machinery



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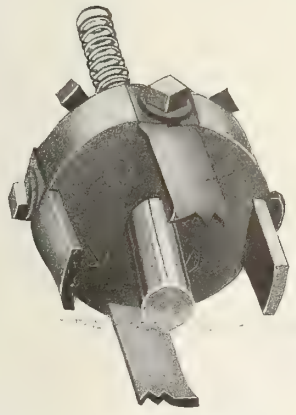

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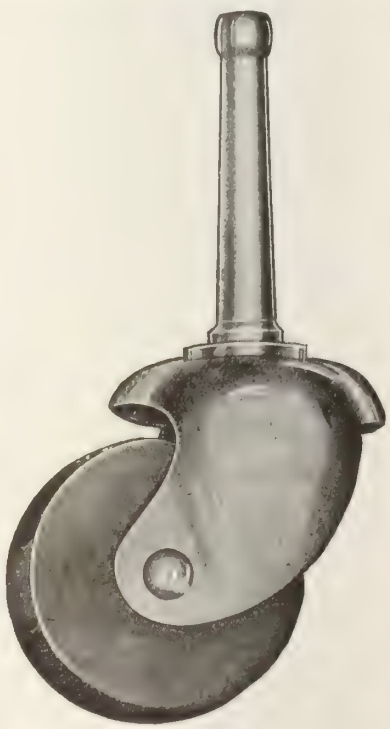

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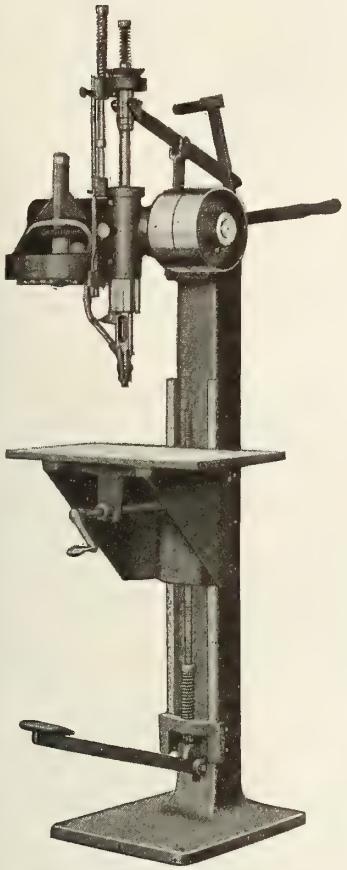

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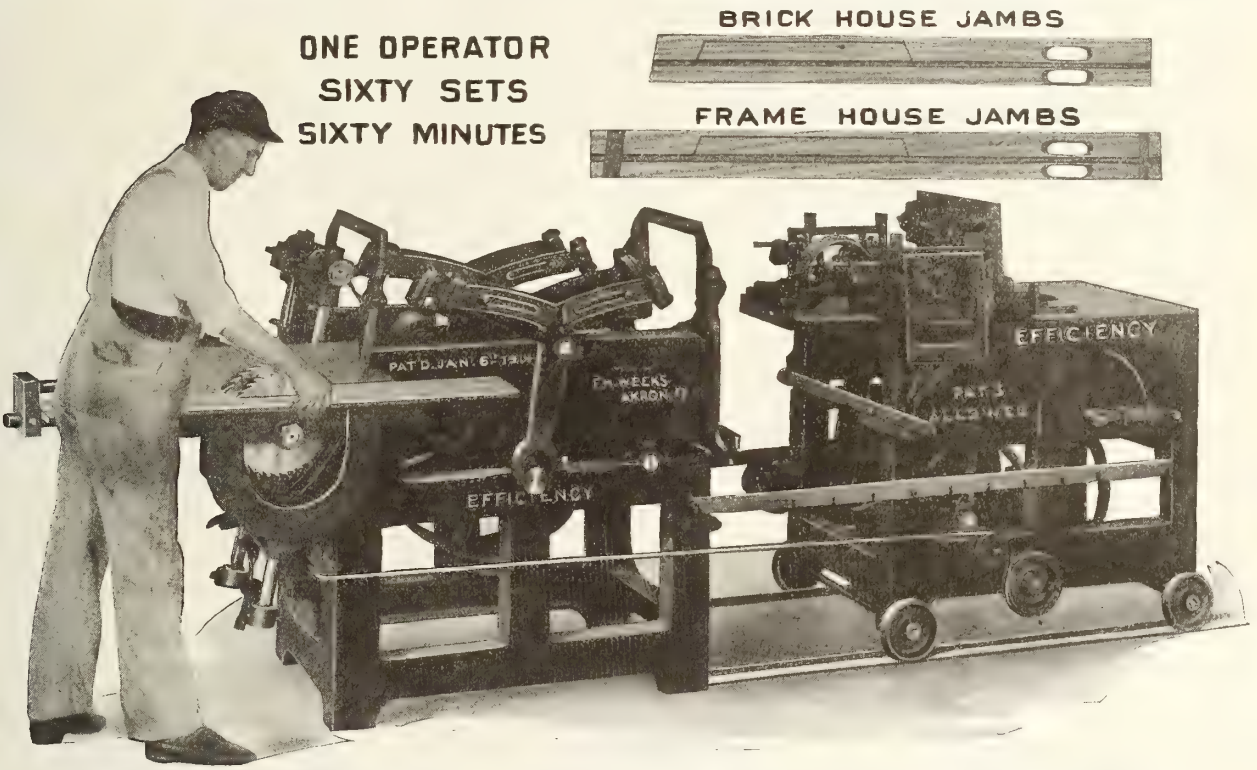

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Vol. 15 **November, 1915** **No. 11**

Shell Box Contracts

ALTHOUGH the manufacturing of shell boxes has become of great importance to the woodworking industry in Canada and has resulted in large amounts of money being circulated among the employees of woodworking firms, we have heard much criticism of the way in which the giving out of contracts is being handled by the Shell Committee, and are in a position to say unquestionably, that there is great dissatisfaction among many woodworking companies upon this score.

For the production of shell boxes there are no plants so well equipped as woodworking and furniture factories. Of these there are thousands in all parts of Canada, most of which are running far below their normal capacities. These plants could turn out shell boxes in unlimited quantities with scarcely the expenditure of a dollar, or the loss of a moment's time, upon re-arrangement or installation of equipment. They are the logical plants for the work. Many such plants have secured contracts for shell boxes and are showing their special capacity for the work.

In the fact of this situation there are many box manufacturers in Canada who have not been able to secure orders for shell boxes; while other companies, not equipped for the work, have been successful. Instances could be multiplied of the dissatisfaction which this sort of thing is creating. For instance, we are informed that such companies as the Deakin Construction Company of Montreal, the Cedars Rapids Construction Company of Montreal, and others, have secured contracts from the Shell Committee, while regular box manufacturers are unable to do so; or are being offered sub-contracts by companies and middlemen who are not actually in the woodworking business. One of the best and largest box plants in Canada received contracts from the Shell Committee for 25,000 boxes, but manufactured 50,000 boxes on sub-contracts. Further, a Montreal firm, not in the manufacturing of boxes, have sub-let their contract to a Montreal box manufacturer.

A very large manufacturing firm, with equipment which is second to none in Canada, much of which is idle at present, wrote to the Shell Committee asking for contracts. They stated that they had a splendid plant; that their machines were idle; that their men needed employment; that they would like to have the Government make an inspection of their plant, and that if they were found to be properly equipped they would be glad to have a contract; knowing that they could produce the boxes in large quantities and with every satisfaction. All this company could receive in reply was a letter from the Shell Committee stating that all the orders at present available were under contract, and that if there were further orders to be given out, their name would be on the list and would be considered in its proper order. After this other firms with no financial rating received large orders, while the firm referred to is still waiting. Further letters have brought only similar replies. Other manufacturers, whose enquiries have been received a little more favorably, have been told that if they will visit Ottawa they will have an opportunity of discussing the matter with the Shell Committee.

From reports that we have received from many firms already engaged in making shell boxes, we understand that the price paid by the Shell Committee allows a fair profit, but not a large one. How then does it come about that contracts are given out to such firms as those referred to above who find it possible to take contracts and to sublet them? We confess that the problem is a little beyond us. How is it possible for other firms to put up extensive new buildings, and install new equipment for the work, when other plants already in existence and well-equipped are urgently in need of the work and cannot secure contracts?

There may be a perfectly clear and reasonable explanation for each of these situations, but up to date none has been offered, that we know of. The people of Canada should have a frank statement from the Committee about the whole matter.

Assisting the Machines

(Staff Article)

TAKING the figures in order of number, we will consider first a case in which, in the writer's experience, the "home-made" rig proved better than the original machine part it was made to replace—that is, of course, considering the state of the steel springs when they were removed. Probably had new springs been put in they would have made a good showing, but in this case the age of the machine itself did not seem to justify the expense even of a new set of springs.

The machine in question was a sash sticker, and as the side springs and their set-screws had become worn, sufficient pressure could not be applied except with the result of grooving the sash stock, which called for a lot of extra sanding to remove. The substitute consisted of a piece of maple, cut slantwise across a wide board, so that the grain ran with the cuts in the edge of the board. This piece was secured with a couple of handscrews to the machine bed, and strips of various thicknesses were used to pack up the spring to suit varying widths of rails.

The call for less manual labor in the moving of lumber in the process of manufacture in order to cut the expense is expressed in the subject of Fig. 2, which illustrates a section of a long out-feed run especially suited to fast-feed matchers. One of these machines will keep a man busy piling the finished stock without having to carry it any distance. The idea is—by means of the arrangement illustrated—to make the

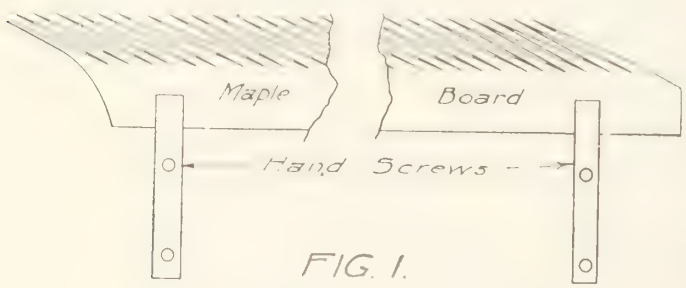


FIG. 1.

machine deliver the lumber where it is to be piled, either in a shed or rack, or else on the wagon ready for shipment. The length is unlimited, but, of course, it is not possible to turn corners, unless there are about ten acres of spare yard space to turn in. It can generally be arranged, however, that the machine will feed in the direction of the destination of the lumber. A flat board wide enough to accommodate the full capacity of the machine, and supported at intervals, forms the base of the run. On the edge of this board—that is, next to the fixed fence of the matcher—is nailed a strip to act as a guide. On the other side is also a strip, but not fixed, it being held by swinging arms which permit the guide to be moved in when narrow stuff is being run, to prevent the ends overlapping. As this outer strip can be made continuous, it can be arranged to be adjustable from any point in its length, and a series of pin-holes near one of the arms will hold the whole thing in position when adjusted.

A ripsaw that has to be operated by one man alone must be provided with some kind of support to hold up the long end of the lumber when near the end of the cut. One often sees a straight board placed square with the end of the bench, and whenever a piece leaves the machine it tips up just in the line of the next one. Every time the operator cuts one piece he has to go around to the other end and push it out of the track. This uses up a lot of time and energy that might be more profitably expended in other ways. In seeking a remedy for this waste we come to Fig. 4. In it we

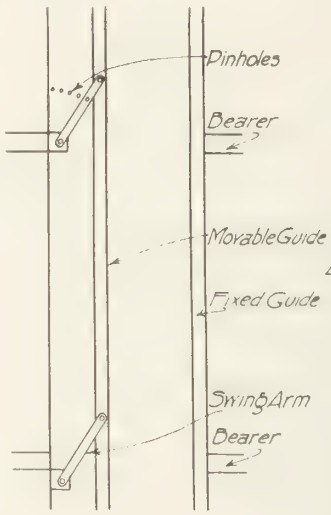


FIG. 2.

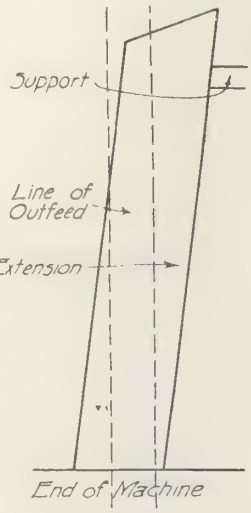
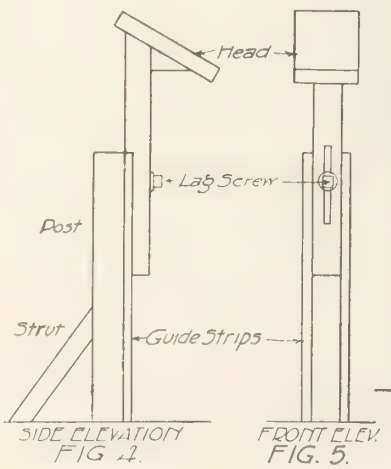


FIG. 3.

still find the plain board, level with the top of the table and long enough to reach the midlength of the longest lumber to be cut, when almost past the saw. The board is the same, but its position is altered: instead of being square with the bench it is set at a slight angle, so that when the piece being cut (shown by dotted lines) tips up, it slides over to one side onto the floor, leaving the way clear for the next cut. Thus the operator is enabled to remain back of the saw and keep right on cutting.

With Figs. 4, 5, and 6, we reach our friend the sticker with the movable bed, which is apt at times to get loaded with something heavier than 1 in. x 4 in. When its feed rolls and pressures were designed they were intended to hold any lumber down to the bed of the machine, always provided that the weight of the timber was also acting downwards. In an ordinary sticker no provision is made to support the weight of a 16-ft. length of 4 in. x 8 in. when 1-ft. is under the rolls and the balance hanging over the end of the bed. Similarly with the pressures; they will



SIDE ELEVATION FIG 4.

FRONT ELEV. FIG. 5.

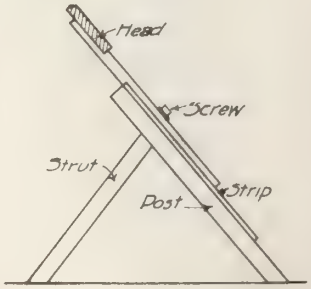


FIG. 6.

not stand the strain imposed by a length of this kind of lumber when all but a foot has been fed out.

A smart man might be able to hold up the piece he was feeding in till the feed rolls had a good grip, and then chase around to the other end and hold up the previous length as it fed out. Such methods, however, do not allow a sufficient margin of safety either for the machine or for the man. A helper is not fashionable in these days, except in places where they pile stuff from the sticker on to a truck, so we come down to the question of providing a suitable support. The chief requirement is that it shall be adjustable to conform to the height of the sticker bed. In Figs. 4 and 5 we have two views of a support the writer saw in use at the outfeed end of the same machine that had another like Fig. 6 on the infeed end. The sketches show how the movable part of both forms is made to slide up or down on the post between a pair of guides, locking being effected in both cases by a lag screw in the post. The use of an in-feed support also helps the operator to feed when standing at either

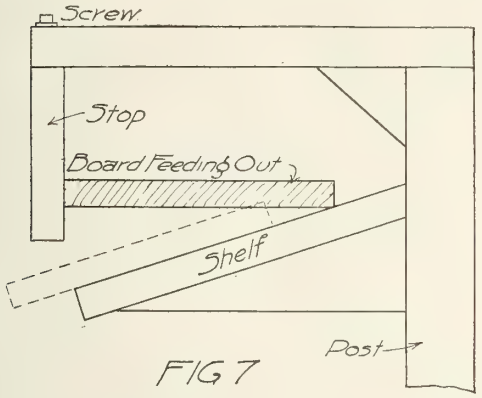


FIG 7

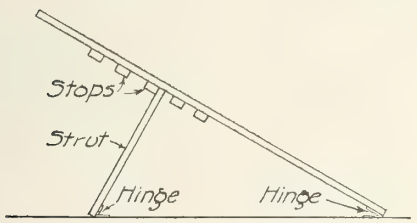


FIG. 8.

end of his pile by taking up one end of a board and getting the middle upon the support, when it can be swung into the feeding line quite easily.

Fig. 7 brings us to a suggestion that has no foundation on any such thing at present existing, and may therefore be subject to criticism, which will be welcomed. Its intended application is to the inside moulder working on moulded base, etc., which it is desired to keep in good condition. This will not permit of dropping the stock on the floor in any old way. The sketch gives an end view of this rig. The shelf would be about 6 feet long, and the nearest end would be 5 ft. from the machine. With the plain sloping shelf the stock would tend to drop downwards and outwards as it got further out of the machine and spoil the work of the bottom head, so the step is added to hold up the edge of the board until fed right out, when it falls and slides out under the step.

The planer receives its share of attention under the head of Fig. 8. Here we have perhaps the simplest rig of all, it being made of 1-in. or 1¼-in. lumber, either in one wide board or in two or three smaller ones ledged together. In this case, too, it is likely that previous experience will help the understanding of it as much as the drawing.

Action and Angles from Machine Saw Teeth

NUMEROUS and varied are the opinions which exist amongst woodworkers regarding what is the proper type of saw tooth to adopt. Many are under the impression that the teeth which are best adapted for softwoods are not suitable for hardwoods, and vice versa. To a certain extent this theory holds good, but unless special hardwoods are to be converted, no alteration of the shape and angles of teeth will improve their cutting powers. For instance, a high-cutting rate is essential for the cutting of both hard and soft woods. A proof of this are the various types of inserted saw teeth on the market. Every interested party knows that inserted teeth carry the most acute rate compared with any other form of saw tooth. Yet the makers and advocates of this kind of teeth invariably declare that these teeth are as well adapted for hard woods as for soft.

The advantages of high-cutting rate are chiefly a greater and more rapid cutting power, besides, much less motive power is required to operate these teeth with vertical log frames, horizontal frames, and band saws. The cutting contact of teeth is at right angles with circular saws when engaged at their full capacity, i.e., cutting at almost their full depth the cutting angle varies from 3 to 85 degrees against the grain. Anyone who is acquainted with the action of saw teeth will admit that the three cutting angles on the above-mentioned principles are not practically correct, the conditions embodied in the action of circular saw teeth being the most defective. I have repeatedly suggested from theory, as well as from experience, that advantageous improvements could be effected in the position of the timber as received by the saws. Of course, no improvement could be effected on vertical machines, such as the log and deal frames and the vertical band saw, but profitable improvements could be made on the circular, the horizontal band, and the horizontal reciprocating saw frame.

I was under the impression that I was an isolated advocate of any reform in this respect, for such ideas were not only not entertained but derided by many who deemed themselves competent judges. However, such opposition did not discourage me or impel me to abandon the contention, that if saws received the wood at an angle of, say, 20 degrees to 30 degrees, with the grain for reciprocating frames, and horizontal band saws, and if under-cutting was adopted on circular saws instead of top cutting, better results would accrue in many ways, viz., first, less motive power would be required; second, smoother work on board or plank surface would be produced; third, saws would be less liable to wander or "lead"; fourth, less set could be given to the teeth; fifth, the saw's capabilities of production would be enhanced, inasmuch as hundreds of more feet could be sawn with the same or one sharpening.—Machine Woodworker.

Even if the insurance companies paid no fire losses, it would be worth while to carry insurance, because the companies are always on the alert to prevent the likelihood of losses. To take out insurance and to improve the plant so as to get the lowest possible premium is one of the best hobbies for the woodworker.

Working Drawings and Directions for Making a Writing-Table

THE long evenings will soon be with us, and with them the opportunity for making ourselves a little more proficient in the trade—and doing it with profit. A reader of The Canadian Woodworker who has fitted up a little shop of his own gives us the accompanying details of a writing-table that he made last winter. The working drawing makes the construction of the table quite clear. If the lumber is purchased at the mill the following should meet the requirements:

Quartered-sawed White Oak

4 pcs.	1¾" x 1¾"	x 30"	—legs.
2 pcs.	⅞" x 11¼"	x 36"	—top.
2 pcs.	⅞" x 6"	x 30½"	—front and back rails.
2 pcs.	⅞" x 6"	x 21½"	—side rails.
2 pcs.	⅞" x 3"	x 21½"	—side stretchers.
1 pc.	⅞" x 3"	x 30½"	—back stretcher.
7 pcs.	⅝" x 4"	x 17"	—slats.
1 pc.	⅞" x 10"	x 30"	—shelf.
1 pc.	⅞" x 8"	x 36"	—back of pockets.
1 pc.	½" x 4"	x 22"	—front of drawer.
1 pc.	½" x 3"	x 32"	—top shelf of pockets.
4 pcs.	⅝" x 5½"	x 8"	—pocket partitions.
2 pcs.	½" x 5½"	x 9½"	—partition shelves.

Soft Wood Drawer Linings

2 pcs.	½" x 4"	x 18"	—sides.
1 pc.	½" x 3"	x 21½"	—back.
2 pcs.	½" x 9"	x 21½"	—bottom.

The construction should begin, properly, with the legs. Select the corner on each that approaches nearest to being a right angle as the inside corner of each, and mark its adjacent faces as your working faces. If the mill work has been accurate, all four corners will be right angles, so in this case select the best looking faces for the outside. Standing the legs in a position similar to their place in the finished table, mark with a pencil where each mortise will be cut.

Laying the legs side by side, accurately mark out each and mortise. Cut these mortises, and fit their adjoining tenons on the rails and stretchers. In the front rail, cut out the drawer space, and in the other rails and stretchers, cut mortises for the slat tenons. When all of this work has been carefully done, clamp up this much of the table dry to see how the joints fit. If O.K. you may glue and clamp for good, using a little cold glue on each tenon and allowing it to stand until it is "tacky." If you do not possess enough furniture clamps for the entire job, glue the ends up separate, being sure to see that they are not in wind.

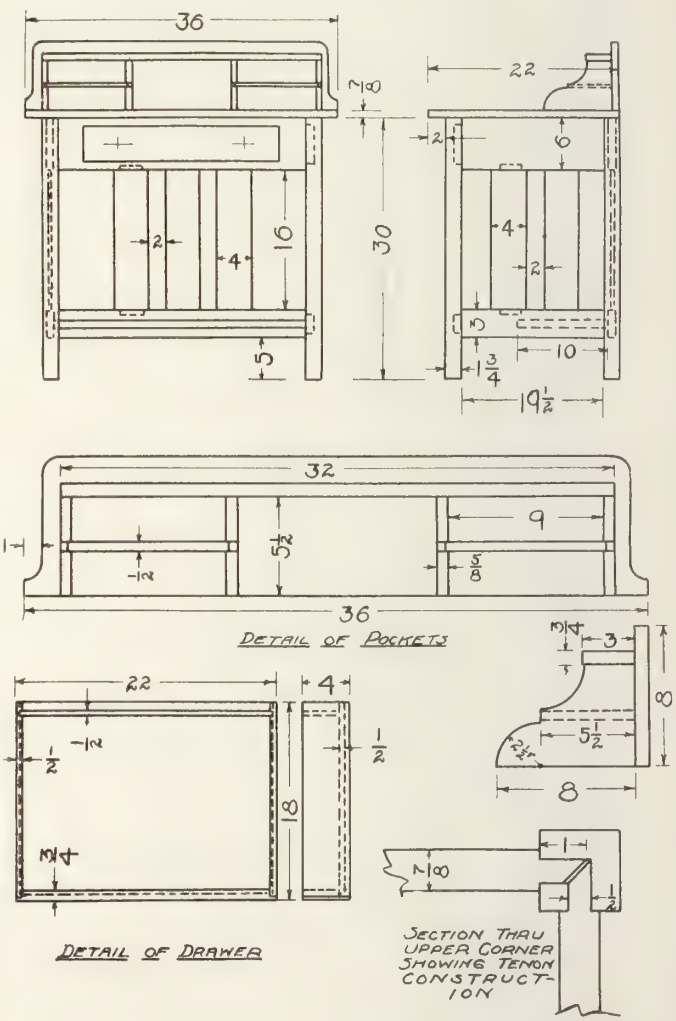
Fit the shelf in at the bottom. Screw it against the end stretchers diagonally up through its bottom, similar to toe-nailing a stud. A few screws into it through the back stretcher will help.

Next construct the drawer according to the detail drawing, and fit it into the table. Drawer slides may be fastened for it from front to back rails. They are right angle pieces made from any kind of wood, and fastened to the rails at each end with angle irons or little corner blocks.

The top is ordered 2 pieces 9¼ in. wide. These are to be jointed and glued up. Make a dowelled glue joint of them or the chances of their holding will be slight. Fasten the top with iron fasteners or with screws put up through the rails at an angle.

The pockets for the stationery and envelopes are made as detailed, and are fastened together and to the table with flat head screws. A careful study of the drawing will make every point clear.

In these articles a great many different finishes for this kind of work have been given, but we will give another one that has not been detailed before, and we have found it to be one of the best. It is known as



Antwerp, and it gives very deep brown tones with lighter highlights.

Apply a coat of silver grey water stain and allow it to dry out very thoroughly. With very fine sandpaper, rub down the "whiskers" raised by the stain, and put on a coat of golden oak oil stain, rubbing it even over the surface with an old cloth. After ten or twelve hours, apply a coat of black paste wood filler, rubbing it in very carefully, and wiping it off the high parts of the grain. When this has hardened, sand it just a very little with old sandpaper, and put on a coat of shellac. Sand this down and put on another. Finally wax it and bring it to a good polish.

A Good Market for Canadian Box Shooks

According to a recent report issued by the United States Department of Commerce, the Canary Islands, with an annual importation approximating 10,000,000 boxes and crates, are among the important shook markets of the world. This great quantity of packing material has heretofore come from Norway and Sweden, and American manufacturers have so far been unable to meet the low prices of the Goteborg shippers. Within the past two months, however, the prices of the European suppliers of shooks for packing bananas, tomatoes, and potatoes have rapidly risen, and c.i.f. quotations now average 25 per cent. higher than formerly.

This should mean that the Canary market is open on a profitable basis to American producers of box shooks. So marked has been the recent advance in prices from Norway and Sweden and so uncertain the deliveries that the largest fruit exporters and the largest wholesaler of shooks and packing materials in Teneriffe have asked for information concerning possible American producers who could supply their needs. High prices induced one wholesaler of shooks to import shooks from Portugal, but he has since reported the wood shipped from Portugal to be too hard, liable to split when the shook is assembled, and generally giving poor satisfaction. He is now anxious to secure samples from American producers of shooks.

The opening of the Panama Canal should greatly increase the chances of manufacturers on the Pacific slope, as the freight rates around Cape Horn had practically cut off this shook-producing section of the United States from all competition here. With the canal in operation, it has been suggested by local buyers that sailing vessels (carrying cargoes of shooks and sawdust, together with ship timber and other lumber) could name advantageous c.i.f. figures in Canary ports. Eastern producers of shooks should note that present supplies usually arrive in comparatively small quantities, and space might be found on board colliers bringing coal to the Canary Islands, of which the number from New York, Norfolk, and Baltimore has been steadily increasing since the beginning of the year.

Specifications for Box Shooks and Crates

Dimensions for the big buyers vary slightly, but the different buyers maintain their own standard sizes and base their freight arrangements on them. Specifications of the most used sizes of crates and boxes are herewith given:—

Banana crates, 28-inch size, $110.98 per thousand, c.i.f.: eight pieces, 10 to 16 by 3 by ⅝ inches; 2 pieces, 14 by 2 by 5/16 inches; 8 pieces, 28 by 2 by ⅜ inches; and 4 pieces 29 by 2 by ⅜ inches.

Banana crates, 28-inch size, $102.80 per thousand, c.i.f.: eight pieces, 10 to 16 by 3 by ⅝ inches; 2 pieces, 14 by 3 by 5/16 inches; 8 pieces, 28 by 2 by ⅜ inches; and 4 pieces 29 by 2 by ⅜ inches.

Banana crates, doubles, $129.57 per thousand, c.i.f.: four pieces, 16 to 10 by 3 by ⅝ inches; 4 pieces, 22 to 28 by 3 by ⅝ inches; 6 pieces, 14 by 3 by ¼ inches; and 16 pieces, 26 by 2 by ⅜ inches.

Tomato boxes, 7-inch size, price per thousand boxes, c.i.f., $57.86: 100 pieces in bundles, 16 by 6 by 3/16 inches; 100 pieces in bundles, 16 by 4 by 3/16 inches; 50 pieces in bundles, 16 by 7 by ¼ inches; 50 pieces in bundles, 9½ by 7 by 7/16 inches; 100 pieces in bundles, 29½ by 1¼ by 7/16 inches.

Tomato boxes, 6¾-inch size, price per thousand boxes, c.i.f., $57.30: 100 pieces in bundles, 16 by 5 by 3/16 inches; 100 pieces in bundles, 16 by 4¾ by 3/16 inches; 50 pieces in bundles, 16 by 6¾ by ¼ inches; 100 pieces in bundles, 28¼ by 1¼ by 7/16 inches.

Potato boxes, $155.75 per thousand: two sides, 29 by 7 by 7/16 inches, in 1 piece; 2 tops and bottoms, 29 by 16½ by ⅜ inches, in 3 pieces; 2 ends, 15⅝ by 7 by ⅝ inches, in 1 piece.

The customary terms of settlement for shooks are cash with a 2 per cent. discount against shipping documents. Shooks purchased in thousand lots are plainly marked as to dimensions or with the private marks prescribed by the individual firms, and are tied with strong wire for transhipment.

Samples are Required

For the shook trade it is indispensable that samples made up on specification should be sent to buyers; only actual experience will show the advantages to accrue from buying these materials in America. Also it should be remembered that great quantities of shooks are being produced in Norway and Sweden, and that these will be thrown on the market after the war has ended and at very low prices. The present exporting season is about finished, and the next crop will be at its height in December. This should allow time for American producers to get in touch with purchasers in this district and to forward samples prepared according to specifications received direct from the buyers themselves.

Coal barges are made in Teneriffe and Las Palmas the year round for use in the rapidly growing bunker-coal trade. Timber for coal-barge making has greatly increased in c.i.f. prices during the past two months, and the big coal companies—three in number— which build their own barges would like to hear from American firms with quotations for deliveries here. As a number of colliers have been chartered to bring cargoes to the Canaries from the United States, lumber could perhaps be shipped above decks, as has been the usual custom with Norwegian and Swedish cargoes of like character.

Box Shooks for Export

One of the largest and most important box shook and lumber operators in Great Britain recently made a tour through Canada. He stated that he was already convinced, from the results of his trip in Eastern Canada, that in the very near future the volume of trade in box shooks between Canada and Great Britain would be increased enormously. Previous to the war, Great Britain secured her material for this purpose very largely from Europe. Conditions which have developed during the past year have directed the attention of English box shook importers to the magnitude of the possible production of shooks in Canada, and this importer, one of the largest in the world, is now most enthusiastic in regard to the trade with Canada. He is absolutely certain that the great bulk of the supply of shooks in future will be secured from Canada. He finds not only the quantity, but the quality, shipping conditions and everything else in favor of the Canadian trade.

The Cost System in Producing Woodwork

By Edward P. Leeds

Competition and the nature of the work they do compel woodworking concerns which execute large orders for the interior woodwork in office buildings, stores, and so on, to estimate costs closely, and submit proposals before they secure contracts. In making these estimates, the work that will have to be done is literally picked to pieces, divided and subdivided many times, and the figures finally arrived at are gained by a compilation of all labor and material costs entering into the work.

Inasmuch as payment on the order is usually made on the basis of 80 per cent. of the amount of actual labor performed, and paid for by the man who does the work, and the material used, it is vital that these costs be accurate and arranged in such a form as to embrace every detail. In some cases payment is made on the report of a firm of certified public accountants, who examine the books monthly and sometimes find it necessary to trace the actual work for which payment is made.

The system used by a Philadelphia concern has proved especially effective. As soon as an order is received in this concern the entire job is given an order number and is then subdivided in the following manner:

Job No. 300: Nature of job—interior woodwork for the twenty-five-storey Brown building.

Subdivisions

Doors	300-1
Windows	300-2
Sills	300-3
Mantels	300-4
Mouldings	300-5
Sash	300-6
Trim	300-7, etc.

Cost sheets are arranged as shown on Form 1. The sheets for each order are preceded by a general sheet bearing the terms of the order, time when it must be completed, shipping instructions and all necessary information. The reverse side of the cost sheet (Form 2) shows in detail the disposition of the money that is charged on the face of the sheet. When work is about to be started, a copy of the estimate as originally made is given the cost clerk, who immediately places the details of the estimate in red ink at the head of the column under which the estimate was made.

How Labor Cost Records are Kept

Labor costs are collected in the factory on a series of job tickets, punched for time by the individual workman and containing all essential information. These cards are gathered at the close of the day and arranged serially according to the numbers of the employees. The employee numbered 100 may have been engaged during the day upon ten different order numbers. In this case ten cards for that would have to be in evidence. To prove that all the cards are accounted for, the total number of hours and minutes shown on the operation cards must agree with the total time the workman was in the factory, as evidenced by the record on his time card.

At the end of the week the cost clerk makes up a trial payroll from the cost cards. The bookkeeper has already prepared the regular shop payroll from the weekly time cards which are rung in morning, noon and night as the workmen enter and leave the factory. These two rolls are then compared, and if they do not show exactly the same pay for each workman, an error is apparent, and is easily traced and corrected. The time of outside employees (those actually engaged in erecting the work in the building itself) is sent to the home factory by their foremen. Separate time reports are used for each man, showing just what part of the job he worked on.

After the payroll is finally corrected the cards are sorted and arranged by job numbers, and rearranged under the job numbers by departments. It then becomes a simple problem to enter the costs under their respective headings. To prove that no figures have been omitted in entry, the entered costs are totalled and again agree with the payroll figures.

The cards are next taken and sorted by operations. The total expended under each operation is entered in the proper place on Form 2. The following example will illustrate: if, under the column "machining," it

LUMBER			MACHINE WORK		FINISHING		ASSEMBLING		ERECTING COSTS		OUTSIDE MATERIAL		HARDWARE		OTHER ESSENTIAL INFORMATION
KIND	QUANTITY	COST	OPERATION	COST	OPERATION	COST	OPERATION	COST	KIND	COST	KIND	COST	KIND	COST	

Description of Order _____ Job No. _____

Date Promised _____ Date Shipped _____

Special Instructions _____

DATE	LUMBER	PATTERN SHOP	CARVING	MACHINING	VENEER ROOM	ASSEMBLING	FINISHING	OUTSIDE MATERIAL	MATERIAL ORDERED NOT BILLED	HARDWARE	ERECTING COSTS	TOTAL LABOR	TOTAL MATERIAL	NET COST
ESTIMATED COST														

Forms 1 and 2.—The front and reverse of the cost sheet are shown above. The estimate is written on the face (front card) and the details of distribution are given on the reverse side. Each job's cost sheet is preceded in the cost ledger by a page which gives the terms of the contract.

is shown that $200 has been expended, the reverse side of the sheet shows how $60 has gone for cutting, $40 for moulding, $60 for joining and $40 for tenoning.

Making Actual Costs Check Up Estimates

The estimated figures are always placed at the head of the cost sheet. The reason for this is that the progress reports on work in the factory and outside show the stage of completion. The cost book shows a total of the actual money expended for labor. If, then, the cost of a particular piece of work had been estimated at $100, while the cost book showed that $75 had already been expended and the work only half finished, an opportunity is provided to check at once any shop errors, and so make the job, when it is completed, show a profit instead of a possible loss.

It is poor consolation for the man in charge of the work to have to go to the head of the firm after an order is completed and report that the firm lost on the job. It is much simpler to keep in constant touch with the expenditure on the work, and comparative cost-keeping serves this purpose admirably.

Keeping Track of the Materials Used

When material required for a job is ordered, the cost clerk is furnished with a copy of the purchase order, from which he can tell the kind of material ordered, price and the job number for which it was ordered. He enters this on the cost sheet under the proper job number in the column headed "Material ordered, not billed." When this material is actually received and paid for, the account again passes through his hands and he immediately takes it from the column where it previously was entered and places it in its proper place as a paid account against the job.

The reason for making entries in this manner is that, in the first place, there may be a thorough and concise account of the job in the cost book; secondly, it frequently occurs, when establishing the cost of a partially-completed job, that material which has been ordered and checked off the estimate of material required is not included in the cost book, for the reason that no bill has been passed through for it. Thus, misleading information is obtained in regard to the amount of material, and this sometimes proves costly.

Materials used from stock, such as small hardware, lumber, paints, etc., are drawn out on a regular requisition which specifies the job number. When filled, these requisitions are sent to the cost clerk, who extends cost and enters it in the proper place.

As to overhead, all employees, as stated before, are required to turn in daily time cards showing the length of time they worked on each particular class of work. These cards are extended, sorted as per classification of work and entered in the proper maintenance account, such as "machinists," "carpenters," "millwrights," "electricians," "clerks," "sweepers," and so on. The percentage of burden is then determined on the basis of the proportion of direct to indirect labor, computed in terms of dollars and cents.

Expense accounts of men travelling on jobs erected on outside orders are kept separate and classified into such items as "transportation," "hotel," "telegrams," "minor incidentals," and so on, and find lodgment on the cost sheet.

How Costs Are Summarized on a Single Sheet

In short, the sheet referred to balances accurately with the bookkeeper's ledger, gives a complete and correct account of all labor transactions, and is the court of last appeal.

Where small jobs are going through the factory in conjunction with large orders, the cost record is kept in the same manner as for large jobs, excepting that one cost sheet can be utilized to contain a record for anywhere from ten to fifteen different jobs. These small jobs are given arbitrary order numbers such as "Z-1," and so on, and the cost clerk enters them in that way in a separate part of the cost book. When it is considered that costs are entered weekly, it will easily be seen how this can be done.

It will also be seen with what facility such small jobs can be computed, as all information thereto is in the office within a few hours after the completion of the work. It is then simply necessary to add the overhead profit, and bill for the amount due accordingly.—System.

Producing Surface Oak

(Staff Article)

IT is a considerable time since the writer made the acquaintance of a surface oak machine. The equipment consists of a brass-covered roller that revolved in a trough filled with ink, over which was placed a gelatine roller that received the imprint from the brass roller, and in this way the material received its decoration by being carried over the top of the gelatine cylinder. The brass-covered roller was cut into a pattern resembling quarter-cut plain oak or any other open-grained wood that it was desired to imitate.

The general result was a clumsy and imperfect representation, and never was such as to make it fit for use on furniture; but it was popular at the time.

However, inventive men began to work on the idea, and very soon had machines that would reproduce the woods quite perfectly.

The impression roller made out of a gelatine composition was cast direct from a selected wood surface and faithfully reproduced the same when the ink, temperature, and other necessaries were correct. One drawback of this machine was the inability of some to keep the gelatine roller in the proper manner to ensure the right degree of elasticity, so that the printed wood would come out clean and sharp and not blotchy.

A simpler and more easily kept machine is one having a hollow roller about 16 or 18 inches in diameter that has been turned in a machine lathe absolutely true and straight. Take selected veneer one-eighth of an inch thick, match carefully, joint and tape, cut the ends to form a lap bevelled joint at the meeting point, dampen the veneer on the outside and bend it around the roller, using a galvanized or heaving tin call, to which has been attached heavy wood lugs for the handscrews. This can be drawn up snugly and left for a sufficient time for the veneer to remain in a shape conforming to the roller when released. The roller can then be warmed thoroughly in a warmer, the glue applied, and the veneer wrapped around and clamped into position. Of course, everything has been done

previously to have the lap joint fit perfectly, which is easily accomplished before any gluing is done.

When the glue has dried thoroughly the roller is sent to the machine shop and again carefully turned, care being taken that the wood is not torn at any part by the turning tool. It is then sanded and is ready to be returned to the factory. First it is gone over carefully with a stiffish wire brush which cleans out the dust from the pores of the wood; then a thin coat of shellac is applied, sanded, and a second coat given; when this is sanded perfectly smooth the roller is ready for use.

The construction of the machine for printing is quite simple, and can be largely of wood, with iron for the wearing parts.

The veneered roller revolves slowly, and is submerged a few inches into the ink on its under side. The surplus ink is scraped off by a scraper having a leather lip, which must be perfectly straight to meet the surface of the roller equally throughout its entire length. The wood roller makes its impression on a gelatine roller which engages the surface above it. This gelatine roller is usually about 8 inches in diameter, and the necessary adjustments for pressure against the wood roller must be provided. Over this gelatine roller is an idle wood roller which can be raised and lowered to accommodate the material which is carried through the machine by pressure on the revolving gelatine roller below it. This arrangement gives a perfect reproduction of the grain of the veneered roller so long as the gelatine roller is not affected by the temperature. It is necessary to keep these gelatine rollers in a moderately cool place, or they will become too soft; and it is advisable to have several of them, so that a soft one can be replaced when necessary.

To prepare wood for oak surfacing it is very essential to have a proper ground work. Soft maple, if fairly clear, makes a very good wood. This must be finished by a coat of primer made up as follows:—10 lbs. yellow ochre, 10 lbs. white lead, 4 gals. stain reducer. This is applied and allowed to stand until dry, when it is ready to put through the machine.

The printing ink for the work is made up in the following proportions:—25 lbs. Vandyke brown in oil, 5 lbs. drop black, 1 quart stain reducer. When the ink has dried thoroughly after printing, apply a thin coat of shellac, sand and varnish. This will be found sufficient for most surface oak work, as the maple ground work is not absorbent and the priming coat seals the wood effectively.

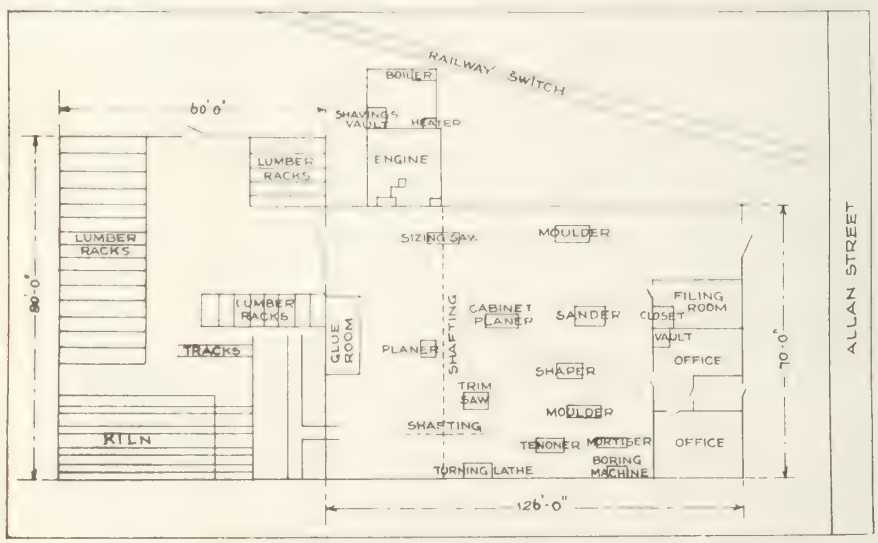
It is in poor taste to select a big splashy figured veneer for a roller, as the effect is too artificial and spoils the work. Plain oak is better in this respect than quartered, unless a moderately small figure is chosen.

Surface oak should never be sold for anything other than what it is, and any names such as American oak should be ranked as frauds and treated as such.

There are also imitations of other woods—principally mahogany; but the methods are similar so far as production is concerned.

Reitzel Brothers' New Plant

The planing mill operated by Reitzel Bros., at Waterloo, Ont., is an interesting example of up-to-date methods in the layout and equipment of this class of plant. The building is constructed of reinforced concrete with mill construction roof. The equipment was mostly furnished by Jackson Cochrane & Co., of Berlin, Ont., but also includes a few machines furnished by the Canada Machinery Corporation, Galt, Ont. The power is furnished by a Goldie & McCulloch 85 h.p. engine and boiler. The plant has a capacity for handling about $40,000 worth of business annually. The cost of the building was $34,000.



Layout of Plant of Reitzel Bros., Waterloo, Ont.

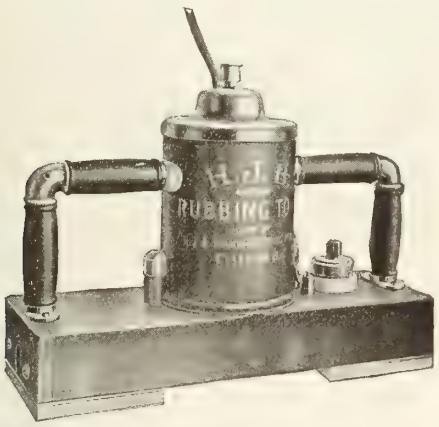
The firm of Reitzel Bros. was formed on March 31st, 1907, to carry on business as architects and contractors in the town of Waterloo. In 1912 they added to the contracting business by starting a planing mill, with the idea of turning out materials for house building to be used in connection with their contracting. This class of material still forms the chief output of the plant, as the firm continues to specialize upon the designing and constructing of special houses.

The accompanying illustration shows the layout of the company's plant and office.

Electrically Operated Rubbing and Polishing Machine

One of the important elements in the cost of any piece of furniture is the finish and polish given it. In the older methods where this was done by hand it involved very tedious and costly work.

An electrically-driven machine has recently been developed which is claimed to be a marked advance in equipment for this purpose. As shown in the illustration, is is a completely enclosed compact outfit connected by flexible cord to any light-



ing outlet. It contains a one-quarter horsepower motor controlled by a simple snap switch. This motor is connected by suitable mechanical means so as to oscillate the two pads on the bottom of the machine. These felt pads are 5½ x 4½ inches in area and are given an oscillating motion 400 times per minute in the direction of the longer dimension of the machine. These pads can be readily removed in a few seconds by the pressure of a finger. To this can be affixed sandpaper or other grinding or rubbing surfaces.

This machine works very efficiently and economically. It does about five or more times as much work as a man can do by hand and at a cost of from one to two cents per hour. The machine is provided with black fiber handles, which make it convenient to move it about over the surface treated. The machine weighs 25 pounds, which weight has been found the most effective for this service. The motor is entirely closed and protected from dust or moisture. The motor itself and the mechanism it operates are very ruggedly built and are free from parts liable to get loose. The machine is very substantial in every respect and is covered by a two years' guarantee. The outfit is self-oiling and needs practically no attention except the turning on and off of the current. In operation the pads move to the extreme ends of the outfit which permits polishing into corners. Although designed particularly for use in the finishing rooms of furniture and piano factories, it is also useful for polishing glass, marble or wood floor or other surfaces. This machine is being sold through Bagge's Export Combine, 53 West Jackson Boulevard, Chicago, Ill.

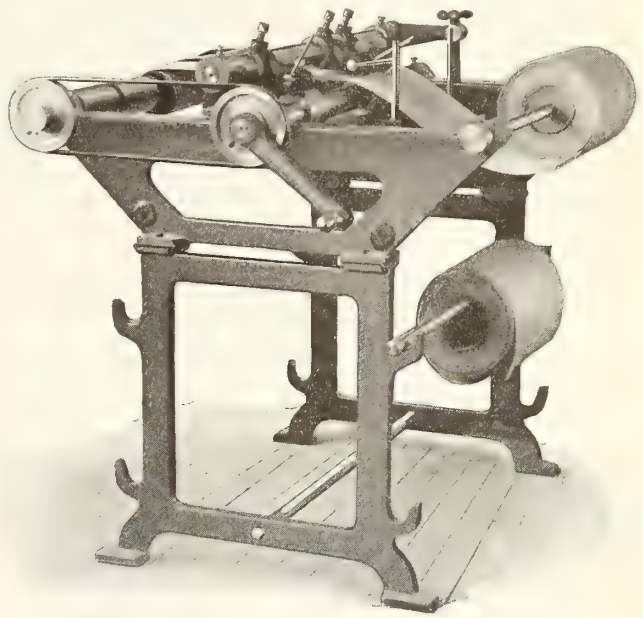
One often hears the question asked as to the length of time required for glue to set in panels or other veneered work. According to a writer in The Hardwood Record, glue will do its primary setting within a few hours, sometimes a few minutes, if the glue is thick and the veneer is rather heavy so that it readily absorbs the surface moisture. The usual practice is to have stock under pressure for at least six or eight hours, and, where convenient, for from twelve to twenty-four hours. It is better, perhaps, to keep it under pressure forty-eight hours, because the primary setting and thorough drying of the glue are two different things. The primary setting may hold so that it is safe to take the stock from under pressure, but there is always the chance that the veneer will pull loose and leave blisters through the strain set up in the drying out of the moisture that has been absorbed by the stock from the glue. It naturally takes a thick pile of panels longer to dry than a single panel, or two or three in a pile, but if the cores and face are thick enough to readily absorb the moisture of the glue, the primary setting should not require a great deal longer than if using a smaller quantity. The best plan to follow is to let the stock stay under pressure for two days, if possible, and if that cannot be done keep it there as long as possible. It will do no harm, and it will often prevent a bad job.

Sandpaper Cutting Machine

The machine illustrated below is a device for cutting sandpaper or sand cloth from the roll into belts, built by the Duplex Moulding Sander Company, Hornell, N. Y.

The main object of this device is to reduce the stock of different widths of sandpaper and cloth to the widest grades used in the plant and cut same into narrow belts best adapted to suit the condition of the work. As the price of narrow belts advances in proportion to wider sandpaper belts, a considerable saving is accomplished.

The machine is very simple in construction, oper-



ated by hand power and provided with three adjustable cutter heads; 24 in. wide stock can be cut in four pieces or any other intermediate widths at once. Besides sand belts, the machine will cut circular discs up to 24 in. in diameter, including centre hole in same.

The cutting knives are practically indestructible and the edges on the belts cut are true to size and smooth, specially adapted for sanding panels and other intricate work where a true edge is required. For cutting wider sizes of stock, the machine is built special.

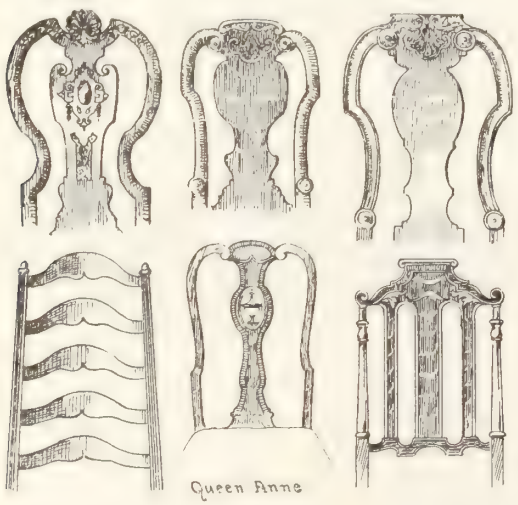
The Queen Anne Style in Furniture

By James Thomson

AS regards architecture, the Queen Anne style is made up of a number of diverse elements, but so far as furniture of a domestic type is involved the Dutch taste dominates. The style, separate and distinct from others, and especially from that which came immediately before and after, had its inception a number of years anterior to Anne's coming to the throne, and ostensibly—so far as dates

go—had ending with her death in 1714. As a matter of fact, however, the Dutch taste had dominance up to the middle of the century. Chippendale, commencing business about 1735, and coming to public notice through the publication if his book of designs in 1754, in his product gave evidence of having been trained in the Queen Anne school. His bandy-legged chairs with the beautifully conceived backs are but refined Queen Anne examples. In its salient features the product of his first period is essentially Hollandish.

We must go back to the advent of William and



Mary (1669) in order to trace the origin of the style that has come down to us under the Queen Anne appelation. When on the death of Charles II. James II. came to the throne he sought to impose upon the whole of his people a religion to which a majority of them objected. His persistence eventually led to his banishment, William of Orange and his consort Mary (the latter a legitimate claimant to the throne) being invited to don the British purple—or, in other words, supplant him.

Now William was a Hollander, and well on in years. His tastes, preferences, habit of thought, and the like, were essentially Dutch. At his time of life it was too much to expect an abandonment of confirmed tastes and habits in favor of what was to be found at the English Court. As a matter of fact, the British Court at once assumed an atmosphere and character essentially Hollandish. It is no doubt a fact, as has been asserted, that shiploads of bandy-legged chairs and pot-bellied bureaux soon made their way to England—for, in order to curry favor with the ruling powers, the nobles and wealthy commoners began to furnish their homes in the Dutch fashion. Where alterations in country dwellings were contemplated by wealthy owners the architects were instructed to consult Hollandish authorities. As a consequence Dutch features were wedded to others strictly classic. In process of time there came out of it all a heavy, and sometimes ornate, but always attractive, semi-

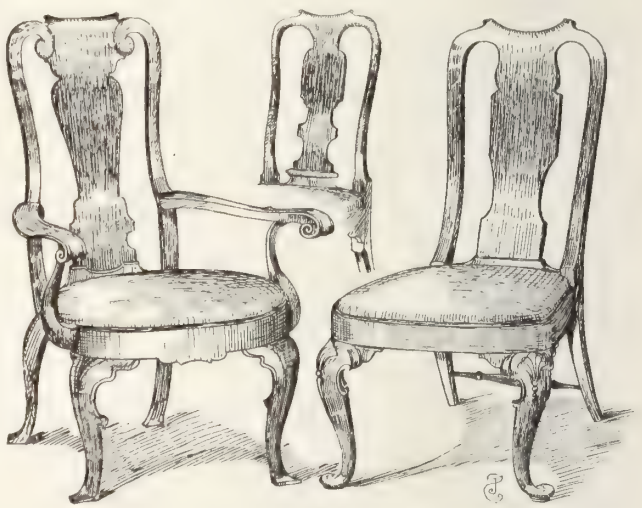


Fig. 1

classical style to which has been given the generic title "Georgian."

A heavy classicism characterized the architecture of the days immediately preceding the advent of William and Mary. The great fire (time of Charles II.) had swept away the greater part of mediaeval London—a circumstance presenting an excellent opportunity for the architects of the day to show their skill. Inigo Jones, a disciple of Palladin, was a leading architect of the time, and had a hand in developing the style afterwards called "Free Classic." The five ancient orders of architecture were put to excellent purpose, but in a manner novel, free, and unconventional. Side by side were classic neatness, refinement, and regularity (more especially did this apply to mouldings) and exuberant fancies in the way of carved fruit, flowers, foliage, shells (scallop and otherwise), grape and vine-leaf compositions, birds, beasts, busts, caryatides, festoons of flowers, fruits, drapery, etc. This free style was mainly fathered by Grinling Gibbons, but conjoined with it was carving of the school of Sir Christopher Wren. Each and all were factors

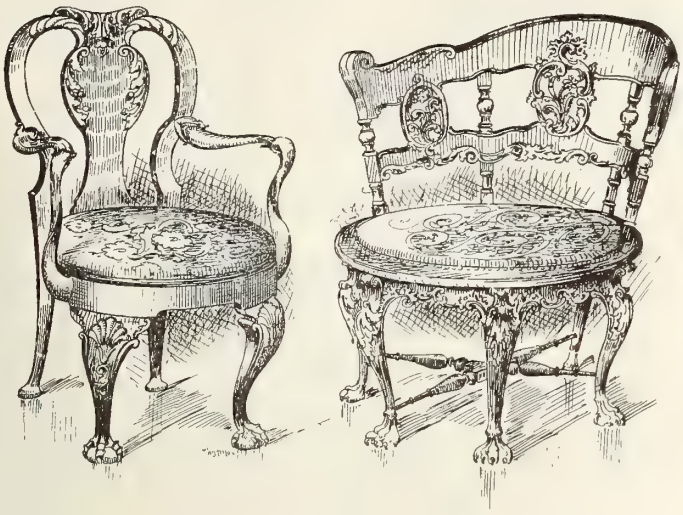


Fig. 2

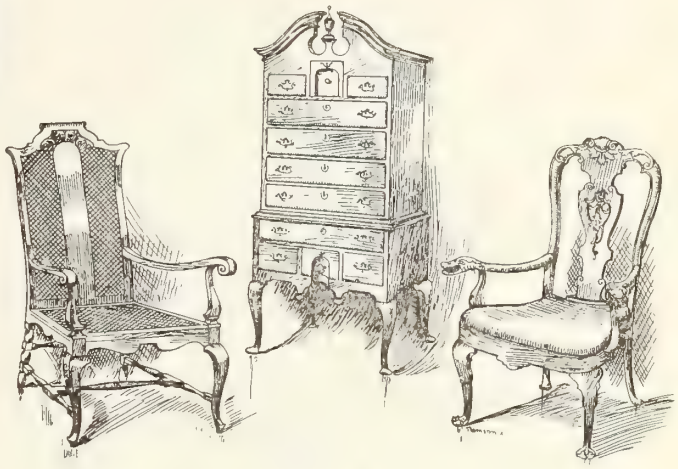


Fig. 3

Fig. 4

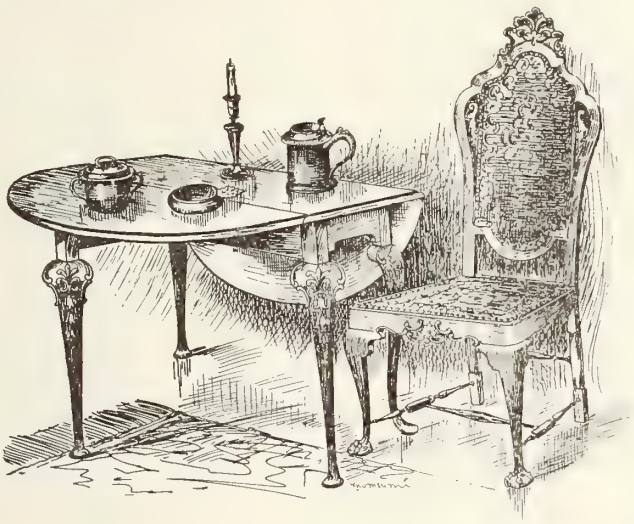


Fig. 5

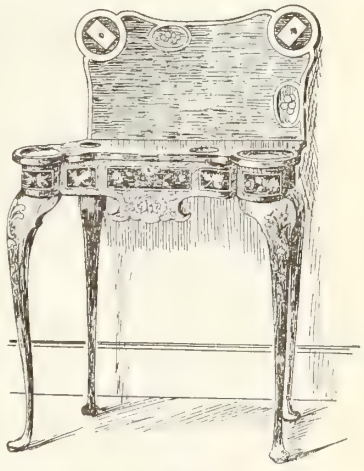


Fig. 6

Fig. 7

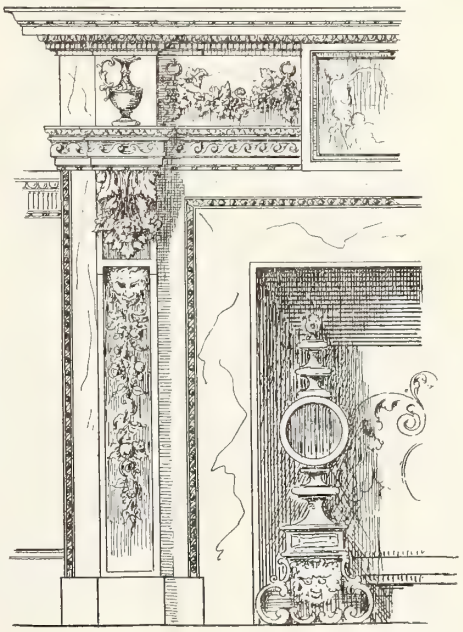


Fig. 8

in forming the style of architecture known as Queen Anne. If ever there was a conglomerate style, here was one.

From Holland came a taste for furniture of the Bombe type. Partly as an expression of skill, and

Fig. 9

partly to show to advantage the marquetry which formed the decoration, the casework was cut up into curious undulations of surface. In a bureau, for instance, quite likely the bottom drawer was made to bulge. In numberless instances difficulties seem to have been created for the mere purpose of showing how they could be overcome. It was never a practice

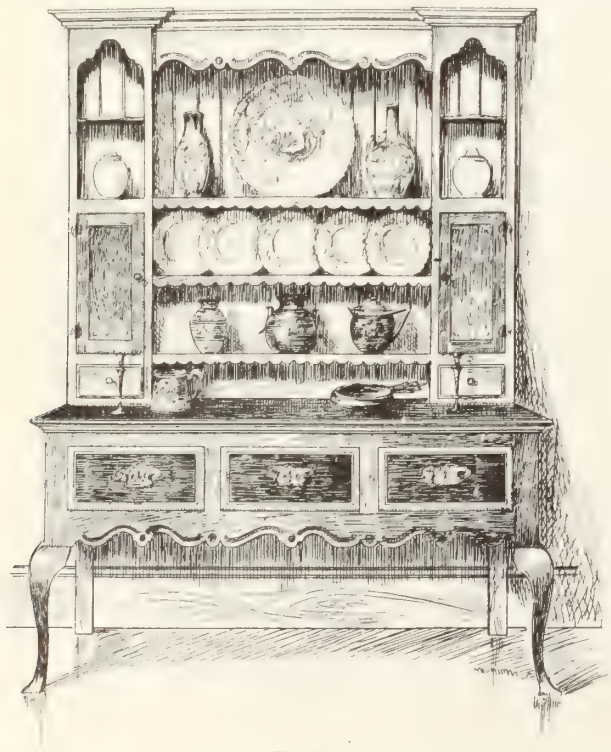


Fig. 10

that took deep root in England—at any rate, not in its baldest Hollandish aspect. What there was of it, much or little, belongs to the Queen Anne classification. Through trading with Oriental nations the Dutch had acquired a taste for the black lacquered gold dust decorated articles of wood such as we of the present day associate with Chinese and Japanese practice. The taste reached England through William and Mary (or Anne), and as a consequence many pieces of furniture of purely Dutch shape are to be found with a brilliantly polished surface of black and decorated with designs of Chinese aspect. In figure this ornamentation is slightly raised and of gold dust. Such articles under the Queen Anne classification are bringing high prices to-day.

At a late period came cabinets (standing on heavy carved legs) such as the one shown in Fig. 13. Aside from the carving, the decoration consisted of ormula mounts in the shape of clasps, corners, lock-plates, and

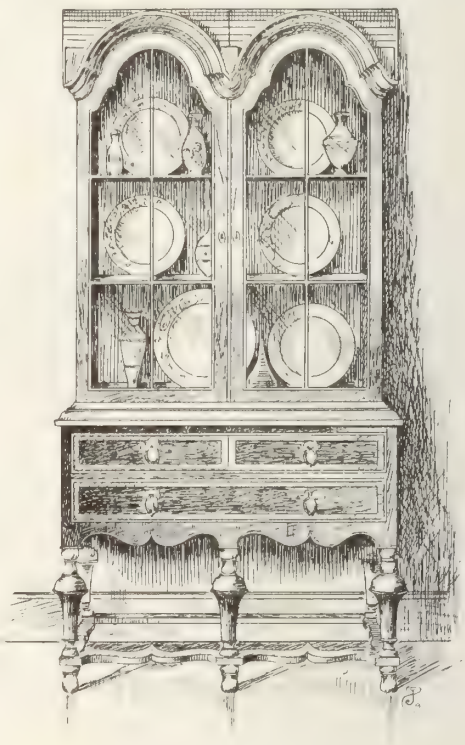


Fig. 11

the like, and panels of marquetry. Such cabinets may be classed as Queen Anne or Early Georgian.

Mantelpieces quite as classic as are to be found at a later period in the work of Adam were made in the Queen Anne age. Mouldings, of Greek refinement as to contour, were sharply carved after the best of classic examples, while on pilaster and frieze were carvings of the naturalistic order—flowers, fruits, heads, vine-leaf and grape compositions, arabesques, etc. Fig. 8 will give an idea of what is meant, being a marble mantel at the Art Club, London, and dated 1710.

In this connection I would remark that to the Queen Anne period must be assigned much that is admirable in interior decoration. A Queen Anne interior in all gold (or white and gold) could be as dazzling and splendid as were those in the France of Louis XIV. Here upon a classic base were imposed Hollandish quaintness and Flemish exuberant fancy.

Inasmuch as the advent of William and Mary established a complete change in fashions for British furnishing of a household kind, I submit in Fig. 1

examples in the way of chairs that in decided manner are manifest of that departure. In aspect absolutely Dutch, such pieces gave new direction to British designing thought.

In Fig. 2 also we have a couple of interesting examples, but of the Queen Anne period. Curiously interesting are the arms of the chair on the left, where water fowl are in the act of swallowing fish. How

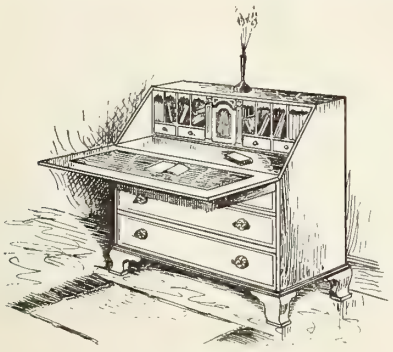


Fig. 12

characteristic of the designing though of the "Low Countries."

Two fine chairs of this kind are shown in Fig. 3. Carved chairs had been common in the reign of Charles II., a fashion that never afterwards lapsed. In old prints illustrative of the Queen Anne age these high-backed, cane-panelled chairs are commonly to be seen.

It can thus be seen that a generation before Chippendale came to the front chairs of the bandy-legged, interlaced backed type were common.

Figs. 4 and 5 are illustrative of the Queen Anne

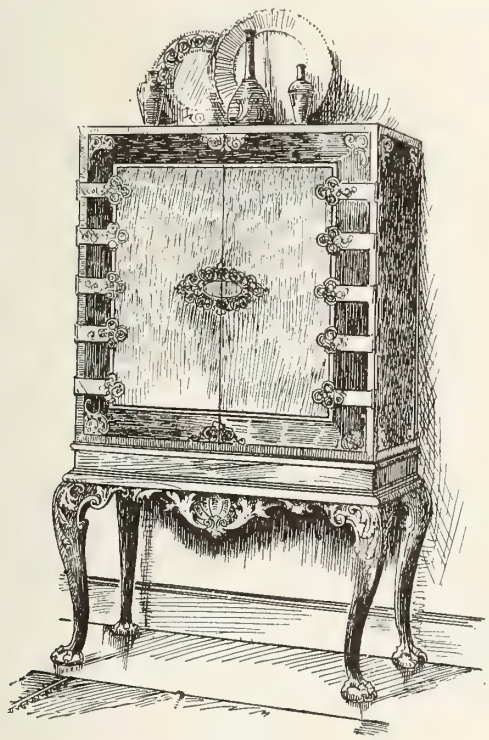


Fig. 13

vogue at its best. Figs. 4, 5 and 6 are at present in one of the London museums. When the table-top is let down there is disclosed some fine inlaid work of bright coloring. Novel, too, is the chair shown in Fig. 5. As far back as the days of Elizabeth shell motives had been common as decorative features. The chair shown in Fig. 4 is a fine example; light, graceful, and no doubt strong, as a designing effort it would be difficult to improve on it.

The chair-back in the centre of Fig. 7 is of a kind usually to be found finished in black lacquer, the ornamental portions within the boundaries of carving being of slightly relieved figure and in gold. The chair on the left is an example such as gave direction to the designing current of thought in Chippendale. It might well pass for a product of his pencil, but unless all signs fail it belongs to the period when he was in pinafores.

Queen Anne died in 1714, while Chippendale was unheard of in a public way until 1754, when his "Director" was published. He was, however, trained in the school of Grinling Gibbons and Sir Christopher Wren. The manner of carving of full flowing line in which Chippendale was trained was for many a year exemplified for us on the stems and sterns of seagoing ships. It was essentially Queen Annish.

In Fig. 9 we have a combined desk and closet. The latter when needs be could be utilized for books.

A typical dresser of the time is depicted in Fig. 10. This is an article of domestic utility in Great Britain usually associated with the kitchen, and should not be confounded with the sideboard or buffet.

In Fig. 11 is shown a well-proportioned china closet. The Queen Anne craze for collecting blue delft ware and Oriental porcelains created a demand for the means to house them properly.

The desk shown in Fig. 12 is of a type destined to have immense vogue. Here we have the article in simple guise, for quite often it was serpentine-fronted and claw-footed. Very often, too, the surface was made gay with inlay of bright-colored woods, tulips, birds, flowers, foliage, etc. Even when the surface was curviliniar and undulating it was not infrequently veneered. Pride in achievement was the incentive in the main.

High Prices Paid for Walnut

THE Forest Service recently sold for gunstocks two large and decaying black walnut trees on the Arkansas National Forest, Ark., at the rate of $20 per 1,000 feet, board measurement, on the stump. This is the highest price ever received for black walnut or any other timber, in the United States, so far as known, and certainly the highest price ever realized by the Forest Service. The scarcity of black walnut and its high price are charged up to the European war, which has caused a tremendous demand for gunstock material. Forest Service officials were advised that a lumber purchaser who was scouring the southwestern forests came across the two Arkansas black walnuts and promptly offered a fancy price for them. The trunks of the two trees were in a dying condition and there was decay in spots. This meant that the wood was in a fairly well cured state, which made it doubly valuable for gunstock purposes. The rule, which has stood since the Civil War, is to cure black walnut for twenty years by the air-drying method.

It is during the short days of winter that one appreciates the usefulness of electricity in factory lighting, and it is also a reminder that one should have the best equipment possible in this line. Here, as elsewhere, the best is usually the cheapest as well as the most satisfactory.

QUESTION BOX

A Practical Department of Reference for the Practical Man

Q.—"It has always seemed to the writer that, inasmuch as there are so many band saws in successful operation, we should not be troubled with our six-inch machines to the extent we are. It seems impossible to keep them from cracking, and, while we get good work on narrow material, the wider stuff does not come out well at all. We should appreciate very much an exchange of ideas on this subject through your columns."

A.—The successful operation of a band saw of any width or capacity calls for careful attention to both the machine and the saw. Many fine machines have been ruined by lack of intelligent care, and even the finest saws will not do good work unless they are kept in right condition. It would be possible for me to give you a complete set of instructions for looking out for both the saws and the machines, but such information is readily obtainable from either the Berlin Machine Works or the W. B. Mershon Company, each of whom have prepared a booklet which deals very comprehensively with the care and maintenance of band saws and machines. The instructions laid down in these books, if properly followed, will result in the good results you are looking for. There is one thing, however, that they do not cover, but which has a lot to do with the problem, and that is the choice of a filer. This is one of the cases where the best is none too good, and on general principles, if you are having trouble, as you say you are, you need a new filer badly. Get a man who understands his business, and who has had experience, and you will have no more trouble with your sawing. A poor filer can waste many times his salary every week, so do not hesitate to pay him what he would be worth to someone else.

* * *

Q.—"As a consequence of alterations to our factory to adapt it to the manufacture of shell boxes, we are confronted with an unexpected amount of sawdust and borings, and it is becoming a considerable problem to get them from the shop to the boiler room where they can be burned. Our exhaust system, handling sawdust and shavings indiscriminately, is—or was—connected to our regular running machines, and what changes we have had made have consisted of additional connections to take care of the new machinery. The result is that with the system so connected it is impossible to clear the machines, and we are troubled with continual blockages. Can you suggest a way to get this outfit in proper balance again without pulling it all down?"

A.—Similar problems have been treated in these columns once or twice before, but as each one is in some way different from the other you will probably have to tackle it from another direction. Your exhauster is probably large enough, as you had proper draft before, but in order to make sure, make a water draft gauge, similar to that described on page 27 of the January, 1915, issue of The Canadian Woodworker, and ascertain what the draft is close to the fan, and then try various points along the system until you find where the excessive drop occurs. It is well to remember that the added areas of all the inlet pipes must be smaller than the inlet to the fan, and you had better calculate these areas as a check. If you find that you have too much area in the pipes, look things over and see if some of the machines could not be served with sweep-ups or floor openings, which would be closed most of the time, thereby allowing more draft on the machines, which must be cleared constantly. Perhaps some of the pipes which must be in continuous operation can be made a little smaller without interfering with their efficient working. Having draft gates installed in all pipes tends to produce a better draft, as generally some of them will be closed part of the time. Another thing which interferes with the proper working of any system is the accumulation of chips, nails, etc., in the large elbows. Such accumulations materially reduce the effective size of the pipes, and make it impossible for the fan to handle its normal volume of air. Each elbow should be equipped with a pocket into which such material can collect, and should be emptied at least once a week. These pockets also catch heavy pieces, such as bolts and nuts (which in some inexplicable manner always find their way into the system), and prevent damage to the fan. Also, by keeping the pipes clean, the fire risk is greatly reduced. If the suggestions given above do not improve matters, the writer would be pleased to go into the matter further on receipt of full details concerning your present installation.

* * *

Q.—"We should like to have some information on the problem of moving lumber, and whether or not the motor trucks are proving to be a success for this purpose. If they are successful, what sizes and what forms are the best?"

A.—Motor trucks could not be other than successful in a line of business such as the lumber industry, where there is so much material to be moved over a large territory. Under almost any conditions except deep snow the motor truck has proved its economy over horse transportation, and the extent of the saving effected by its use is dependent almost entirely upon the manner in which it is handled. The same rules and regulations which govern the horse do not apply to the motor truck, which, requiring no rest periods between loads such as are afforded the horse by loading and unloading, should be kept on the move as near continuously as possible. To this end, rapid unloading devices are imperative, and rapid loading is highly desirable if it can be accomplished. Individual problems need their own particular treatment, but the avoiding of delays is the keynote to successful truck transportation, and the further it is carried the more successful will be the outfit. There are many styles and forms of trucks available—and here again the individual requirements must be carefully studied. In

general, however, long loading space is required without too long wheel-base, and for this reason those forms of machines having the seat mounted over the engine so as to secure the longest possible load-carrying space are best. Capacity requirements are best met by a light machine for quick deliveries of small lots of material, and a heavy machine for large loads—say, one ton capacity for the small one, and five tons capacity for the large one. Interchangeable express bodies for the small one and a good dumping body for the large one will give the best results, and if possible interchangeable bodies for the large one will be a good plan. If this cannot be worked out successfully, some other form of quick loading should be devised so as to keep the machines on the road the greatest possible portion of the time. Gasoline-driven trucks are used at the present almost exclusively, but the electrically-driven truck is becoming more and more universal in its application, and where cheap power is available (as it invariably is in the lumber business) the electric truck is the most economical and reliable from all points of view. Any firm equipping their delivery service with trucks at the present time would make a serious mistake in not investigating the electric proposition pretty carefully.

* * *

Q.—"Being a circular rip saw operator, and desiring to make a suggestion to my employers which will improve the quality of our work, I am writing to ask if there is any reason why a swedged tooth should not be used on small circular rip saws to good advantage. It seems to me that a swedged tooth would give an easier and smoother cut, but there are some who claim that it cuts harder and that the set tooth which we are using is the best for the purpose. Can you tell me what has been the experience of others in this line?"

A.—There is no question but what you are right concerning the use of a swedged tooth. It certainly will do better work, as both edges of each tooth are in the cut at the same time, resulting in a finer chip and smoother work; while the fact that both tips of the tooth cut equally, thus equalizing the pressure on the saw, also tends to produce better and cleaner work. So far as the easier operation of the saw goes, look at it any way you will, and you can find no apparent reason why it should not cut easier—and this is the actual result in practice, as you can ascertain for yourself by fixing up a saw with a hammer swedge to try. If you succeed in convincing your employers, get them to procure a good eccentric swedge like the ones used in swedging band saws, and, if possible, an automatic grinder—all of which will easily be a paying investment.

* * *

Q.—"As a result of an argument, I have been requested to write for an explanation of the fact that a belt will stick to a crowned pulley, thereby proving that the belt tries to climb to the high side, and how this is reconcilable with the fact that in lining up a shaft the belt will invariably go off the low side of the pulley. There are some who claim that to line up a shaft with the belt on it, it should be pushed back further on the tight side so as to make that side tighter and thus induce the belt to go to that side, while I claim that the reverse is the case."

A.—It is not difficult to prove that your opponent in the argument referred to is in the wrong; you can make him disprove his own theory by a demonstration. A belt running to one side on a pulley can be brought into line in only one way, and that is by moving back the end of the shaft toward which the belt is running until it is in line and runs straight. This is a fact and unchangeable, and it is astonishing to find men who believe to the contrary, in spite of their inability to prove their contentions. So far as the reconciling of this fact that a pulley does not climb to the high side of the pulley with the fact that it will stick to a crown, you have only to assume that each half of a crowned pulley is a separate pulley out of line with the shaft, and that the two halves of the belt are each pulling in opposite directions, trying to get off instead of trying to stay on. An equal pull in opposite directions, however, results in the belt staying in the middle of the pulley as a compromise, and here it will stay until the shaft gets sufficiently out of line to bring half of the pulley in line with the driving shaft, at which time, there being no compensating action, the belt goes off the low side. You can make a pulley which is pretty badly out of line carry a belt if it has crown enough, and you will always observe that in cases where there is a shifting motion of the arbor, tending to get it out of line with the driving shaft, the pulleys are made with a very heavy crown.

* * *

Q.—"What is the reason for a band saw staying on wheels which are turned and ground as flat as it is possible to make them, while a belt running on flat pulleys would be an absolute failure?"

A.—A band saw is not like a belt, in that it is made longer on the back edge than on the front edge, and in addition has what is called tension—that is, while the back of the saw is longer than the front, the middle portion between the two edges is longer than either, giving a slightly circular section to the saw. When a saw is placed on the wheels, therefore, provided the wheels are dead in line, the front edge back of the teeth will be right, while the other portions will not touch at all. To compensate for this, the top wheel is now tilted slightly forward so as to bring the saw tight on the back also, leaving the middle portion slightly loose when the saw is idle. As soon as the saw gets into the cut, however, the strain on the cutting edge slightly stretches the front, and the saw then bears flat the full width of the blade. If the tension is not sufficient the cutting edge of the saw gets loose and cuts snakey instead of straight, and if loose enough and the cut heavy enough the saw will go back on the wheel and off if not relieved. The saw is held on the wheel, therefore, by a kind of wedge action resulting from the front being shorter than the back, and the tension of the saw prevents it from losing this shape under a heavy cut.

Good cutting may not improve the figure in a log or veneer flitch, but it does improve the appearance of finished veneer.

Whenever a furniture man says that he has tried veneer and has turned back to solid panels in woodwork, you can rest assured that he did not try it thoroughly, or else that he has been unfortunate in getting veneers that had been poorly put up. Moreover, whereever you find a man knocking veneered work, whether he is a manufacturer or user of veneered products, or simply an observer, it is certain that he is either ignorant on the subject, or else that he has come in contact with improper work.

Fuming and the Fuming Chamber

Staff Article

THE method of coloring or tinting oak by means of the fuming box is gaining adherents among the furniture manufacturers day by day, and the time seems opportune for a few hints and general directions to those who wish to install their own fuming chamber, but are unfamiliar with the process.

Fuming possesses many advantages over stains, either oil or water, and is certainly the nearest approach to the coloring of age. With the system one accomplishes in a few hours with strong ammonia fumes the same result as is brought about by years of action on the tannic acid in the oak fibres by the small percentage of ammonia in the air. Any tint can be obtained with certainty, and uniformity throughout an entire batch can be assured by timing.

The color penetrates quite deeply—with the darker shades about one-sixteenth of an inch, and much more where the end grain is exposed. This is a decided asset, as it obviates the possibility of a chance knock exposing the raw wood.

Furthermore, the fumes do not raise the grain, so that those unfortunate rough spots often occurring with the use of stain are checkmated. The color also is clear and pure in texture, for the fumes do not affect the natural transparency of the wood.

There are a few disadvantages, but these are insignificant. However, it is best to cite them in order that the tyro may be prepared.

Firstly, the red American oak does not fume at all well, and had better be avoided. Certainly white and red oak must never by any chance be made up into the same goods, or the finisher will be inclined to say hard things of the method when he sees the result after fuming.

Secondly, sap stuff is not affected, and has to be toned in later. Also care has to be taken that no glue or grease spots are left on the work, or a white patch of corresponding size will be the result.

No big outlay is necessary in the construction of a businesslike fuming chamber, and the finisher himself with the assistance of one of the cabinet-makers might easily plan and construct it in a few days.

The size is best arrived at by the foreman finisher, who knows how big the batches are that pass through his department and the time he figures on getting it through. Once the size is determined, the space should be marked out on the floor with chalk—preferably at the farther end of the department.

Scantlings should then be cut and the frame work erected, allowing for one door space. The top of the chamber should be about twelve or fourteen inches from the roof of the department. The covering material may be compo board or millboard. Tongue and groove lumber as covering material is strongly depreciated, for the writer well remembers the trouble he was up against where this material had been used and the joints had opened through shrinkage.

As it is, the joints of the compo board should have strips of stout paper pasted over them to prevent leakage, the whole idea being to make the chamber airtight and fume-tight. The door may now be fixed in place—and it should be mentioned here that the top half of the door should contain a frame of glass in order that the process may be watched, leaving nothing to chance. It is advisable to affix a strip of carpet or rubber to the bottom of the door to prevent any leakage through this crevice. It is an asset to have a small sky-light in the top of the chamber so that the light may be as white as possible when required. Should the light from this sky-light be very strong it should be screened during the operation, as light has the effect of retarding the action.

If the fuming chamber be an exceptionally big one, windows may be put in the sides, to facilitate full view of the pieces in the chamber, these being screened in the same manner as the sky-light.

The interior fitting depends much on the class of goods manufactured. If the line is parlor suites, hooks may be attached to the roof scantlings and walls on which to hang frames.

Should the line be dining-room goods and bedroom suites, racks are necessary to hold leaves of tables and siderails of beds, etc. The supporting rails of the racks should be tapered to an edge. This is most important, as if any part of the woodwork be shielded from the ammonia fumes a white streak will result. The foreman should bear this fact in mind when putting through table leaves, and rest them on the under side.

The disposition of the ammonia trays is a matter for individual judgment. Provision must be made to run off the surplus ammonia when the required shade has been reached, or the finisher will get a darker shade than he anticipated. The best way to effect this is to have the trays at a short distance from the floor, and run off the surplus liquid by means of a tube soldered to the bottom of the tray.

Another method is to cut small traps corresponding in size to each tray and to draw out the trays at this stage of the process by means of cords. This is much of a makeshift, and is not advised unless there is only a small amount of work to do.

Caution must be observed with the use of ammonia; the fumes are dangerous, and must not be inhaled. Before taking the work out always leave the door open for a few minutes. If the chamber is a big one, a fan or two would materially help to dispose of the fumes.

Here are a few additional hints that should be helpful:—

(1) As a rough estimate, half a pint of ammonia is sufficient for a case; this differing with the quality of the liquid. The strength of the ammonia should be 880 degs.

(2) Take care that there is a free air space around all cases, and that the cases do not touch.

(3) Owing to transparency, the color lightens a little when it first comes in contact with the light, and also when finished. Allow for this when fixing your color tone.

(4) Wood will darken more quickly in hot weather. Hot water pipes in the vicinity of the fuming chamber will quicken the action.

(5) If you are new to the game, just try out a few samples and finish them up.

Don't forget that your responsibility to a varnish extends to the workmanship performed in its application.

By the way—

Ford says Canadians **must** buy his cars. Dear reader, if you have the price, buy some other car—or walk.

* * *

Municipalities which desire an easy and inexpensive road to a reputation for good works might "donate" machine guns.

* * *

The incorporators of a newly-organized house-wrecking concern at Toronto are Aaron Stein, William Fink, Samuel Floderwasser, Solomon Eknowitz, Abraham Litovitz, David Ochekowsky, and Eiser Reitapple. If house-wrecking gave out they might try jaw-breaking.

* * *

That talk about constructional operations in winter is staged at the right moment, if any confidence can be placed in the weather prophet of Paris, who has staked his reputation on the forecast that winters will be unusually cold for twenty-six years.

* * *

Shells and patriotism at reduced rates is the latest bulletin posted at Ottawa. Mr. D. A. Thomas had something to do with the price of shells but a federal minister who asked for subscriptions for machine guns is responsible for the cheap patriotism. Subscriptions came with a rush till enough had been received to purchase 1,700 guns, and then it was discovered that an order for all available machine guns had been placed long ago. So while they are figuring what they'll do with the money you can become a No. 1 hard patriot by donating the price of a machine gun. And it won't cost you a cent for they can't get the gun.

* * *

"I long to be a colonel and with the colonels stand" may be the college yell of Sir Sam Hughes' 1915 class of Honorary Colonels. And after all they may serve a purpose. With colonels so numerous it is quite a distinction to be a private. That should help recruiting.

* * *

D. B. Hanna, third vice-president of the Canadian Northern Railway, stands accused of being an humorist. During the recent joy ride of senators and members of parliament over the line Mr. Hanna found occasion to remark "It was important M. P.'s should see their own property." Whether either the aged denizens of the Senate or the sprightly young members of the Commons smiled deponent sayeth not. But it was a joke even if it was on our representatives elect or rather on the country. For the people of Canada have paid for the road from the first shovelful of mud to the last spike, though the title thereto is in the name of Mackenzie & Mann. And the joke will be all the more pointed if the joy ride was the prelude to another "loan."

* * *

Here is an absolutely true story from the fighting line in France. One of the brightest and most capable commanding officers sent from Ontario was one day hurrying forward his battalion to support a threatened line of trenches when he noticed a motor car approaching him at terrific speed. To save his men from being run over he halted them. The car, a beautiful $10,000 one, stopped, and out stepped a man in the uniform of a Chief of Staff and shouted "What in h— are you doing here?" My friend, believing himself in the presence of Lord Kitchener or Sir John French, saluted and approached the car to make his report. To his amazement he recognized an old friend, a Canadian real estate man and now an Honorary Colonel—"attached." There is more to this story, but the above serves to illustrate the indignity the really efficient officer is compelled to put up with. The Canadian people undoubtedly paid for this car and its running expenses. This is but one instance of how our money is being wasted and to what Canadian officers are being subjected.

* * *

The United States mourns and refuses to be comforted because Britain is restricting her trade. Let our cousins gather what sunshine they can from the fact that prosperity is returning to their country, aided and abetted by sundry munition contracts and war prices for their wheat.

* * *

Here's hoping President Wilson in his excitement doesn't get his notes mixed and send the Kaiser one of those intended for his fiancee. Well, now, after all the mistake mightn't be noticed.

* * *

Canada for the first time in her history is selling more than she buys. That spells prosperity. The war is costing a lot of money and its conclusion promises to find this Dominion deeper in debt than ever, but with more money to pay its debts than ever before.

* * *

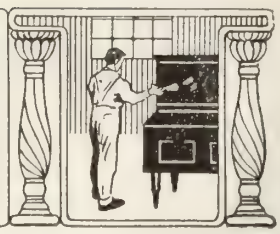
The French Commercial Commission, which has just arrived in New York, will spend a cool billion for machinery, war supplies and foodstuffs. Will the Minister of Commerce kindly tell us what steps are being taken to ensure that Canada gets her share of this business For you know our Minister of Commerce can make a rattling speech and as a financial critic he is in a class by himself. But as the man on the corner remarked "that line of stuff don't get us anywhere." A certain line of action that would bring results would be to some purpose.

* * *

The curse of Canada is too much politics. Every cabinet must have its party fence builders as well as its nation builders. The former are supposed to keep the party in power, while the latter do their work. But history shows that nearly every government Canada has seen has gone down to defeat because of the crude work of some of its "practical politicians." On the other hand the late Sir James Whitney adopted as his policy a blunt honesty that apparently cared not who it huffed or hurt. Coming as it did after the political trickery that finally resulted in the downfall of the Ross Government, it was refreshing. Perhaps, after all, honesty is the best politics. It is the practical politician who must oil the party machine and while engaged at this messy job he generally succeeds in spilling enough oil to grease the skids on which his party slides into opposition.

"Commentator."

THE FINISHING ROOM



Something About Buying Varnish

How the Manufacturer Can Protect Himself by Making Physical Tests of Varnishes and Other Material—Tests to be Made and How to Make Them

A SALESMAN calling on the average furniture manufacturer who is still buying his materials under the old method is expected to go up to the finishing room and interview the finisher if he has done business with the firm before, and if it is his first visit, he is generally permitted either to interview the finishing foreman in the finishing room, or the finisher is asked to come to the office. In either case, the salesman will transact his business with the finisher.

This method is rapidly becoming a thing of the past, and the manufacturer is waking up to the fact that there are leaks in the finishing room which are well worth his attention. Instead of being permitted to visit the finishing department, the salesman is now requested to state his business in the office and tell the manufacturer what he has to sell. After putting up his little sales talk, if he impresses the manufacturer favorably, he is permitted to submit a small sample for a try-out. When the sample is received, it is sent to the finishing department with instructions to the finisher to try it out and report to the office what he thinks of the article. Often the sample is left standing in the finishing room, in some out-of-the-way place, for several months, or until the salesman again visits this territory, and then he is told that either his varnish did not work out satisfactorily, or that it is pretty good, but not good enough to justify a change. On the other hand, if the finisher tries it out, he puts it on two or three cases and makes his report to the office that the varnish looks pretty good, or is not as good as the varnish then being used, or it is no good at all. He does not consider that atmospheric conditions very materially affect the working and drying of varnish and that he may obtain a number of results under different conditions. In this way a good sample of varnish may be turned down because the finisher has either forgotten or has used it under conditions which do not make the result satisfactory. On the other hand, a poor sample may be accepted because it was used under very good conditions, or because the finisher had turned down a number of samples previously and it was about time he made a good report on one.

Physical Tests a Safeguard

A visit to a large furniture manufacturing establishment revealed the fact that some manufacturers are taking steps to safeguard their purchases. They are not permitting the varnish salesman to proceed directly to the finishing room for a confab with the foreman finisher, but are making him display his wares in the office, and if he has an article to offer which, in the judgment of the manufacturer, is a better article, or is as good for less money as the material they are using at the present time, the salesman is asked to submit a gallon sample which his house can supply at the price quoted, and which is a sample of the quality the varnish manufacturer agrees to furnish as long as the furniture manufacturer buys their material. This sample when received is taken to the testing room, which is a small room in the finishing department, and used exclusively for the testing of various materials, and when the purchasing agent has the opportunity he, together with the foreman finisher, will make a physical test of the sample received, and take an eight ounce sample bottle of the varnish, which is labelled with the result of the test and hermetically sealed. The balance of the sample is used in a practical way and applied to a number of pieces of furniture which are marked and dated, and permitted to proceed through the various operations in the regular manner, the result of the finish noted in each stage.

Sample Boards for Exposure Tests

The manufacturer referred to keeps a supply of boards in his finishing room, of the same kind of wood as is most extensively used in his line of manufacture, which in this instance is oak. These boards are about six inches wide and twenty-four inches long and are put through the regular finishing process until they reach that stage where the sample material, whether it be first coat or polishing varnish, is to be applied. As a rule, three sample boards are used, one-half of each of which is then given the kind of varnish which is being used at the present time, and the other one-half is varnished with the sample varnish. These pieces are then permitted to dry about ten days, after which they are placed on the roof of the factory where a rack has been built to hold these sample boards, which gives them a southern exposure at an angle of about 30 degrees. These pieces are looked over carefully by the finisher every morning at 7 o'clock, and every evening just before quitting time, a record being kept each day as to what condition the varnish is in and whether any change takes place. Samples are left exposed to all kinds of weather until the varnish shows a checking or cracking, and it is then noted whether both the sample varnish, and the varnish the manufacturer has been using, will check at the same time, or how long one began to check before the other.

A certain varnish salesman who was aware of this manufacturer's method of making exposure tests, severely criticised the proceeding, saying that he was not selling a spar varnish, and if he thought the manufacturer had wanted the varnish for outdoor finish, he would not have sold it to him. This is not the manufacturer's idea, but we all know that furniture in

By A. J. Smithe in the Furniture Manufacturer and Artisan.

transit is exposed to the weather, and the test is merely a comparative test to discover what the sample varnish will endure in comparison to the varnish at present used under exactly the same conditions.

The manufacturer does not expect a furniture varnish to stand up indefinitely when fully exposed to all climatic conditions, especially during the winter months, but this manufacturer knows that a certain varnish will stand exposure to snow and rain during the winter months without any indications of checking or crazing for better than 350 hours and when brought into the factory and rubbed and polished will show a finished surface equal to any of those in the factory.

The manufacturer is not interested in what the varnish is made of, in a chemical sense, as long as the varnish does the work it is intended for, and gives the results expected. The manufacture of varnish can safely be left to the varnish maker, and the furniture manufacturer is not trying to discover what the varnish is composed of, but he does wish to get a record of the varnish by which all other varnish from the manufacturer may be judged. In order to accomplish this it is necessary to make a physical test to establish the specific gravity, viscosity, and length of time required to dry.

Specific Gravity

The specific gravity of a varnish is its weight in comparison to the weight of an equal quantity of water. For determining the specific gravity of a varnish, a specific gravity bottle is used which will hold 100 grams of distilled water at a temperature of 70 degrees Fahr. The bottle is equipped with a glass stopper which has a small pin hole through it which permits the excess water to escape when the stopper is put in the bottle. In this way the bottle is entirely filled and there is no possibility of making an error as to quantity when the bottle is filled with varnish. The bottle is filled with varnish at a temperature of 70 degrees. The stopper is put in and the excess varnish permitted to escape through the hole in the stopper. Any varnish adhering to the outside of the bottle is carefully wiped off. A small scale, which is capable of weighing as small a particle as one seven-thousandth part of a pound, is then used, on which the specific gravity bottle containing the varnish is weighed. The bottle filled with water should weigh exactly 100 grams, therefore 100 is adopted as a standard.

All oils and varnishes being lighter than water will show a lower specific gravity, and the bottle filled with varnish will weigh probably between 110 and 120 grams. Each specific gravity bottle has its own weight marked on the bottle, and this weight must be deducted from the weight of the bottle filled with varnish, which will probably leave the weight of the varnish between 80 and 90 grams. Therefore, by adopting 100 as a standard, because a certain quantity of water weighs 100 grams, the specific gravity of varnish will be 80 to 90, meaning that a given quantity of varnish is just that much lighter than a like quantity of water. If the varnish manufacturer introduces any other material in his varnish, or if he makes a change in the use of oils or gums, it will change the specific gravity because no two different oils or gums have the same specific gravity.

Viscosity Tests

The viscosity of any liquid is the time required for a certain amount of the liquid to run through the same hole. To determine the viscosity, one must have a viscosimeter with thermometer, a 200 centimeter cylinder, a 50 centimeter cylinder, and a stop watch. It is not absolutely necessary to use the 200 and the 50 centimeter cylinders, as any measuring glass will do by which one can always measure the same amount of liquid. It is preferable to use a cylinder because it is narrow and tall, and it is easier to judge the quantity in a vessel of this nature than it would be in a short and wide vessel. There are a number of different viscosimeters which may be purchased from any of the chemical supply houses, but the one which probably is best adapted for use in a furniture factory is Scott's Viscosimeter, which may be purchased for about $15. This viscosimeter is equipped with a cup which has a thumb trip valve in the centre, which closes up a small hole in the bottom of the cup, and which may be opened immediately by pressing the thumb on a lever permitting the liquid to run through. This cup is set in a larger tank about ten inches high. This tank may be partly filled with water, and an alcohol lamp set underneath to heat the water, to keep the varnish at the necessary temperature. Of the sample varnish received, 200 cubic centimeters is measured out and poured into the viscosimeter cup. A small hole through the cover of the viscosimeter cup will permit a thermometer to be set in the liquid, and after the temperature is taken, it should be brought to 90 degrees. If the varnish is being tested in cold weather, and the temperature is below 90 degrees, water may be put in the tank surrounding the viscosimeter cup and an alcohol lamp set underneath to heat the water which will gradually bring the varnish up to the desired temperature. On the other hand, if the temperature of the varnish is above 90 degrees, the viscosimeter cup may be surrounded with cold water which will reduce the temperature to the desired point. When the temperature has reached 90 degrees, it must be made to remain there, either by removing the heat and adding a little cold water in the tank, or by applying a little heat according to whether it has been necessary to raise or lower the temperature. When the temperature of the varnish is at 90 degrees, and has remained there for several minutes, a 50 cubic centimeter cylinder is set directly underneath the hole in the viscosimeter cup. When all things are ready the tester has a stop watch in his left hand which he starts at the exact moment that he opens the valve in the viscosimeter cup with his right hand. When the liquid in the cylinder underneath the cup rises until it reaches the 50 cubic centimeter mark, the tester will release his valve and stop the stop watch at the same time. This will give him the exact time required for 50 cubic centimeters of varnish to pass through a certain sized hole at a temperature of 90 degrees and which is known as the time viscosity. Every viscosimeter has a water figure stamped on it which represents the time required for 50 cubic centimeters of distilled water to pass through a hole in the bottom of the cup.

A liquid that is said to be viscid is a thick or gummy liquid, and the viscosity of any liquid is really a measurement of the thickness of that liquid. Knowing the time required for 50 cubic centimeters of water to pass through a certain hole, and also knowing the time required for a like amount of varnish to pass through the same hole, both liquids at the same temperature, it is easy to determine the viscosity of the varnish in comparison to the water. For example: we have a viscosimeter with a water figure of 10.2,

which is the time required for 50 cubic centimeters of distilled water to pass through the hole at the bottom of the cup. The same amount of varnish at 90 degrees requires 153 seconds to pass through the same hole. We therefore divide 153 by 10.2, which leaves an answer of 15, or which means that the varnish is fifteen times thicker than water, and therefore has a viscosity of 15. As with the specific gravity, the viscosity will vary with any change made in the manufacture, or in materials used in the making of varnish.

Flash Tests

The flash test is not as important in testing varnish as are the two previous tests, but one may determine, with a reasonable degree of accuracy, the drying qualities of one varnish as compared with another. For this purpose a small iron pot is used about one and one-half inches in diameter and two inches deep. This is surrounded by a water jacket and set on legs about eight inches high. This cup is filled to the top with varnish at a temperature of about 70 degrees, and then an alcohol lamp is placed underneath which will gradually raise the temperature. From time to time, as the temperature is mounting higher, a lighted wax taper should be brushed across the surface probably from one-fourth to one-half inch above the varnish. A thermometer should be kept in the varnish continually, and when the varnish has reached a temperature where it will flash, i.e., when the fumes will catch fire as the lighted taper is passed over the top, then the temperature should be noted, which in testing varnish should be in the neighborhood of 98 degrees. This is the flash point and a higher or lower flash point indicates either that a slower drying oil has been used or the varnish contains some drier.

Record Kept for Comparison

A record sheet printed in form for this purpose is filled out when these tests are made, showing a gravity test by hydrometer, the specific gravity test, the time viscosity, the specific viscosity, and the flash test. In addition to these, a record is kept of the exposure test, also what materials were used in finishing the sample boards, how long each coat was permitted to dry before again coating, when the sample boards were exposed, and when taken in. A record is also kept of the cases which were coated with the sample varnish, how long the varnish was permitted to dry before rubbing, when it was rubbed, what kind of a polish it took, and whether it lost its lustre after standing thirty days after being polished. The main test by which the manufacturer judges the varnish is the practical test when the varnish is put on the cases. The other tests are merely a record which establishes an identity for that varnish. If the practical test on the cases justifies further interest, the manufacturer orders a barrel and when this barrel is received, a sample is put through the same test procedures as the sample was subjected to. If the varnish manufacturer has submitted a sample which is a better article than he expected to sell in barrel lots, and he ships a barrel to this manufacturer of a different varnish, this fact is revealed immediately by a variance in the specific gravity, viscosity, and flash tests. Also, if a manufacturer changes the quality of varnish after he has shipped to a furniture manufacturer for some time, the change is immediately detected by making these physical tests, as any material change in the varnish will immediately change one or all of the physical properties.

The First Aid Column

A department within a department to which Foreman Finishers and others are invited to turn for a solution of the practical problems encountered in their work. Readers are particularly requested to give the trade the benefit of their experience from time to time by replying to the questions asked. A number of new queries are to hand this month. They are given below. Be a live wire. Let us hear from you.

Finishing Turned Work on the Lathe

The writer would be glad to have ideas as to finishing turned work on the lathe.

Answer by W. J. Beattie, Owen Sound, Ont.

Turned work may be finished in a lathe, as follows. If the work is to be stained and filled, do this first: place in the lathe and French polish it, by using a pad made from cotton batting and cheesecloth dipped alternately in raw linseed oil and shellac. Keep the pad moving laterally as much as possible while holding it on the turned piece, or ridges will be developed in the finish. Have the turned piece revolve at a fair rate, but not too fast.

* * *

Answer by R. J. Truax, Chatham, Ont.

I would advise the use of boiled linseed oil applied with a cotton cloth while the work is in motion, and rubbed in well. One thin coat of shellac should then be applied in the same manner. A smooth and glossy finish can thus be obtained.

* * *

Answer by J. G. Walker, Winnipeg

Hodgson's Finisher gives the following as a polish for turned work after it has been stained to the desired colour: Dissolve 1 oz. sandarac in half a pint of spirit of wine; shave 1 oz. of beeswax, and dissolve it in a sufficient quantity of spirits of turpentine to make it into a paste; add the former mixture to it by degrees; then, with a woollen cloth, apply it to the work while it is in motion in the lathe, and polish it with a soft linen rag. This will give it the appearance of being highly varnished.

Installing Pneumatic Rubbing Machine

We are thinking of installing a pneumatic rubbing machine in our factory. We have observed that some plants have the tank and compressor right in the rubbing room, which is generally some distance from the power supply. We are of the opinion that it would be better to have our compressor and tank in the machine room, but should like to have the opinion of some of your readers.

Answer by W. J. Beattie

I would advise the installation of the compressor and tank in the machine room. The necessary piping can be run to any desired point in the plant. The intake pipe should be directed to some portion of the plant where the air is free from dust. If there is a fairly good basement under the floor, this will answer. If run outside, the pipe should be hooded with fine

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14	Quartered Oak	1s.	72 x 20 x ⅜—5 ply	57	Plain Oak / Birch	1s. / 1s.	60 x 30 x ⅜—5 ply
4	Mahogany	1s.	72 x 20 x ⅜—5 ply	57	Birch	2s.	60 x 30 x ⅜—5 ply
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184	Quartered Oak	1s.	60 x 30 x ⅜—5 ply	17	Mahogany	1s.	72 x 24 x ¼—3 ply
47	Quartered Oak	1s.	60 x 24 x ⅜—5 ply	27	Mahogany	1s.	60 x 30 x ¼—3 ply
17	Quartered Oak	2s.	60 x 20 x ⅜—5 ply	19	Quartered Oak	2s.	60 x 30 x 3/16—3 ply
111	Quartered Oak	1s.	60 x 20 x ⅜—5 ply	9	Plain Oak	2s.	60 x 30 x 3/16—3 ply
1	Mahogany	1s.	60 x 20 x ⅜—5 ply	20	Plain Oak / Birch	1s. / 1s.	60 x 30 x 3/16—3 ply
31	Quartered Oak	1s.	60 x 18 x ⅜—5 ply	19	Birch	2s.	60 x 30 x 3/16—3 ply
11	Quartered Oak	1s.	48 x 18 x ⅜—5 ply	330	Maple		48 x 48 x 3/16—3 ply
41	Quartered Oak / Plain Oak	1s. / 1s.	60 x 30 x ⅜—5 ply	24	Maple		42 x 42 x 3/16—3 ply
44	Plain Oak	2s.	72 x 24 x ⅜—5 ply	135	Maple		36 x 36 x 3/16—3 ply
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October 30th, 1915

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Chapter 4—*Methods in the Glue Room*
Chapter 5—*Glue Room Equipment*
Chapter 6—*Selection of Glue*

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meshed wire, so that dust will be kept from entering, and in such a position that it can be cleaned occasionally. The air compressor can be used for quite a number of things around the furniture factory. The pipes can be so placed that the machinery and shafting pulleys can be kept clean by using a good half-inch hose fitted with a long iron nozzle, the air being controlled by an ordinary valve. There are two different kinds of compressors used—the belt-driven, and the direct steam-driven. The latter will be found the more satisfactory, for so long as there is steam pressure sufficient to drive the compressor the rubbing or other work can be done without the plant being run for that purpose alone—a consideration which in these fluctuating times it is well to bear in mind.

Temperature of Water Used in Mixing

What effect has the temperature of the water, used in mixing, on the qualities of water stains? What is the best temperature to use?

Answer by W. J. Beattie

The aniline dyes used to make water-stains are mixed with the water at boiling point—212 deg. Fahr. —and will be thoroughly dissolved at this temperature. Of course the stain should not be at that degree of heat when used, but should be warm, as it penetrates much better than if applied cold. Obviously it would be impossible to use a stain dipping vat if the stain were hotter than could be borne by the hands of the user, and the glued joints would suffer—not to mention veneered surfaces.

Equalizing Colour in Staining

I have stained some pine chests with a dark oak stain, and, on account of the variation in the quality of that wood, the joints show abrupt variations of colour. How can the colour be equalized?

Answer by W. J. Beattie

After staining the pine chests, give them a coat of shellac—or two coats, for that matter, if the shellac is very thin—and shade the light portions with soluble spirit colour, in the same manner as described in answer to the first question, being careful to use the proper shade to match the dark portions.

* * *

Answer by J. G. Walker

I think the variation in the colour of woods at glue joints could be overcome by using glue of the same colour as the wood. Dark glue will show on a light-coloured wood.

* * *

Answer by R. Ferguson, Toronto

The stain should be placed on the wood direct, before any size or filling has been applied. It may be applied in warm or cold water, diluted to the proper strength. A sponge is the best medium, and care should be taken that the stain floods the wood equally. Let the stain be weak: it is easier to apply a second coat than to lighten the first.

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Veneers and Panels

Efficiency in the Veneer Mill

By G. D. Crain, Jr.*

A basic manufacturing principle which some members of the veneer trade have found it hard to assimilate is this: the lower the cost of the finished product, the more necessary it is that every part of the work be done as efficiently as possible. A corollary of this proposition is that the man who is making a cheap line of goods, whether clothing, automobiles or veneers, must make them cheaply—that is, at low cost—in order to make a profit.

The low price of the finished article is not the result of a sleight-of-hand of manufacturing, but simply the application of efficient methods on a very large scale.

Suppose, however, that considerable waste were permitted in a factory of this kind, making an extremely cheap product in large quantity. Just as the small savings are made large by multiplication, so small leaks and losses become huge obstacles to success.

The importance of this proposition is apparent when it is remembered that the production of rotary veneers for use in box manufacturing and in other lines where a cheap product must be used, has become one of the most prominent features of the business. Some of these large mills, producing hundreds of thousands of feet of this material daily, must be given first place when it comes to listing the veneer plants of the country as to manufacturing capacity.

Some of them are models in every way. A large Arkansas mill which has been running only a comparatively short time is pronounced by those who have seen it to be the best in the country. It is built with an eye to permanence and accuracy in manufacturing. The floors and foundations of the mill are of concrete, the walls of steel and brick. The machinery is motor-driven, getting rid of excessive transmission equipment. The drying department is impressive in the capacity provided and in the expensive machinery which has been installed to take care of the large output of stock coming off the lathes every day.

This is an illustration of the Ford idea, worked out in the veneer business. Some people might think that such expense is unnecessary or undesirable in a mill making cheap stuff, and that with the big overhead represented by the investment in the plant and machinery it would be impossible to make any money at this plant. Such reasoning, of course, is specious, and is far from the truth. The mill, in spite of its big load of expense, is making more money, in proportion to capital investment, than any other of the kind in the country, simply because it is doing everything in the best possible way.

There are other large mills which are not run so well. In the first place, the buildings are cheap in construction, and in addition to lacking permanence they also make for poorer work on account of excessive vibration. This point might be considered of little moment in making cheap veneers, but it must be remembered that quality standards are applied to goods which sell for a low price just as to those carrying higher quotations. The man who is buying rotary veneers for manufacturing drawer bottoms for cheap furniture wants to make those drawer bottoms as good as he can for the money; and hence the mill making cheap stuff, which is turning out the best veneers of that particular kind, will get the business.

Some of these plants have drying facilities that are, to put it mildly, obsolete. They are taking up an immense amount of space, and requiring a labor expense which is out of proportion to the value of the material. They are really doing the thing the expensive way, but fail to realize it because the expense is in the form of pay-roll, which is hard to analyze, instead of in the invoice for machinery, which nobody can get away from. Here again it is the bugbear of overhead expense that keeps manufacturers from doing the thing the best way.

On this account one almost regrets the invention of cost accounting, which has given manufacturers some ideas which they have absorbed in just sufficient degree to get the wrong angle on the whole proposition. In connection with overhead, for instance, the veneer man knows that he must make a charge, in figuring the cost of production, for interest on investment, depreciation, taxes, insurance, etc., all of which are larger, of course, in a large plant than in a small one. The result is that making improvements on a large scale immediately suggests additional costs to be taken care of.

The mistake is made in stressing the wrong feature. Of course, when one buys more machinery and puts a bigger expense into his buildings, it goes without saying that the overhead burden will be larger; but the thing to think of in this connection is not the increased load that the business must carry, but the lightening of the load through the reduction in production costs. The concern which has set out to make its factory as efficient as possible, and has erected modern buildings, installed up-to-date equipment and introduced improved manufacturing methods, all with this in view, doesn't need to worry much about overhead, except as a guide in fixing selling prices; that will take care of itself.

The manufacturer of cheap veneers, who is holding back from making his plant as good as it ought to be, with the vague idea that because he is turning out low-priced goods he must operate on a low-priced basis, should think the proposition over from the start, and see for himself the mistake he is making. He is unconsciously thinking that an increased investment will not result in a proportionately greater production and probably lower production costs, but only of the initial expense which must be loaded on the business.

*Abstracted from an article in Veneers.

He is playing the game on a penny-wise and pound-foolish basis.

This man, who sees that the manufacturer who is turning out sawed oak veneers, or has a panel plant which is making up material for high-priced furniture, is going to great expense to do the work just as well as it can be done, realizes that this is good policy, on account of the value of the goods produced; but he sometimes forgets to apply the moral to his own business, merely because the value of his product, per item, is less than at the other kind of plant. But let him regard the fine examples of veneer manufacturing efficiency which have been presented to him by various concerns in the past few years, and he will realize that it pays even better to operate on the proper lines when one is making a cheap product than when it sells at a much higher figure.

Pointers for Panel Men

By Lewis Clarke

GRANTED a modern equipment, in order to produce panels on a profitable basis three things are absolutely necessary—good stock, good mechanics, and a good system. Take either of these three considerations and imagine the result of its absence. Of what use are all the up-to-the-minute labor-saving machines unless the stock is of good quality? Poor stock, badly kiln-dried, spells bad work—shrinkage, warping, open joints, and all manner of unforeseen trouble, the net result of which is a host of unsatisfied customers and consequent loss of business. No amount of careful machining can possibly rectify the faults of badly seasoned stock.

Again, since you have a modernly equipped plant, why entrust your work to mechanics whose previous bad work and methods prove their incompetence? A panel manufacturer has got to make things go; he has got to have a big output—and in order to do this he must train under him a staff of foremen and mechanics who by constant association with veneer and built-up work have reached that stage of efficiency necessary to this end. Poorly paid labor in a plant of this character generally mean unskilled labor, and is a losing speculation. Efficient men are worthy of their hire always. It takes about three years for an average artisan to learn enough to be of real value to the panel manufacturer, and men qualified to be foremen are few and far between, and when found are well worth retaining at an encouraging wage.

It is rather a matter for surprise that so few veneer men really understand the characteristics of their stock and glue and the processes they employ every day. Much has been written in The Canadian Woodworker and other technical journals of interest and real help to panel and veneer men, and yet, generally speaking, there is an unaccountable lack of knowledge of the very fundamentals of their business on the part of foremen and mechanics.

There are far too many rule-of-thumb methods and too little initiative in the majority of panel plants. Therefore, Mr. Panel Manufacturer, if you want to see an improvement in the quality and output of your product see to it that Tom, Dick, and Harry and the rest of the boys in the department get their "Canadian Woodworker" with the "Veneers and Panels" department scored with blue pencil. The knowledge they lack will be found there, and the interest created will help them to enjoy their work—and the men who make a hobby of their work are the men you want, for they mean better work and more of it!

So far as the third consideration—good system—is concerned, if you have good mechanics you will generally have good system. Now-a-days good system spells increased output, and foremost in the endeavor to this end is the correct layout of the department. For a suggestion as to a logical and tested disposal of machines for a department of this type, refer to last month's copy of this journal.

Except for some additions which panel specialization calls for, this plant might well be adopted as a standard. It is recommended, however, that additional space should be given for racks for short ends, which should be roughly sorted as cut, to facilitate their use in core building later.

The racks should be placed as far as is possible within arm's length of the clipper. As far as possible it should be the aim of the foreman that nothing be wasted, and so far as the panel stock is concerned these racks will effect a great saving.

Probably the greatest cause of trouble with panel work, even more so than inferior glue, is badly dried core stock. Unless the core is thoroughly dry at the time of gluing trouble is bound to follow. It is a good practice at the commencement of a big batch of work, when the condition of the stock is questionable, to take two specimens of core stock cut the same size, and test them out for dryness. Place one piece of stock in the heater and leave it for three hours or more and then compare it with the other which has been kept out. The comparison is often an eye-opener, and absolutely settles the question of dryness.

Now while this test is mentioned as advisable, it is not intended for one moment that core or any other stock should be absolutely without moisture (if such a condition is possible under ordinary circumstances), but that it should be well kiln dried.

It must be obvious that wood of all kinds absorbs a certain quantity of moisture from the air, and that this certain percentage of moisture is necessary to its preservation. Therefore if you force out all the moisture from the core it will most logically obtain that moisture from the atmosphere at the first opportunity when it leaves the press. This would mean unequal expansion, and panel trouble would begin right there. So that if the core stock is well kiln dried do not take it as a bad sign if, after making the foregoing test, the pieces vary three-eighths of an inch in length. Common sense must be the guide in fixing the point of dryness—but just watch that point if you would avoid one of the chief trouble-makers.

One hears many and divers opinions on the selection and preparation of the glue, and in passing it is well to run over a few of the most important points as they affect the panel plant.

Firstly, in buying glue do not expect to get good glue at the lowest price. There are so many grades of glue that the wisest and most economical course to pursue is to get samples from time to time and test them out before buying in bulk—and be sure the order is up to the sample.

Some manufacturers buy their glue in sheet form even yet, but is is better to get it ready ground. It is claimed by these manufacturers that by buying in sheet form they can see what they are getting. But when all is said and done, surely it is as easy to test ground glue for quality as sheet glue. Not only is the ground glue more easily dissolved, but should the glue run short at the close of a day a small quantity can easily be prepared.

And here let it be mentioned that one of the sure

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signs of a progressive foreman is the way in which he mixes his glue. If he mixes his glue by guess he is out of date and is wasting valuable glue and valuable time. There is only one way of preparing glue successfully, and the manufacturer should see to it that this method is adopted in his plant. The glue should be weighed and the water measured.

It is impossible to tell from the appearance of the bulk of ground or any kind of glue what proportion of water should be added. It may be fine ground or it may be coarse ground, and naturally the finer ground it is the less it will bulk.

Further, as regards proportions, it must be remembered always that too much care cannot be taken in the graduation of the heaviness of the glue solution. Soft woods require a heavier solution than do hard woods. Experience is the best guide to show what strength the glue should be for the various classes of stock.

It cannot be too well known that copper vessels are the best glue containers, and it is a matter for wonder, considering the stress that has been laid on this fact, that some plants still cling to the old-fashioned iron glue containers.

With well kiln dried stock and carefully mixed glue the mechanic can confidently expect a good job. In putting the batch through with veneered core work or ply the stock should be put through the spreader and a pile built up systematically.

It is not necessary that the cauls should be more than well warmed. Overheated cauls and consequent burned glue trouble is to be avoided—and may be avoided easily by the exercise of a little judgment.

When the stock is built up, put in press, and locked, it should be placed in the store room for from twelve to twenty-four hours, according to the class of stock being used. It is well to be on the safe side and give it a little longer than seems really necessary, for the time thus expended is time saved in the long run.

At the completion of this time it should be stored in the drying room with the strips so placed as to afford the maximum of ventilation. The temperature of the drying room should never be allowed to fall below 70 degrees Fahr. From one to two weeks is the time generally given as the correct period for drying, but this point, as most others in panel practice, is best fixed by personal experience of the time taken by the particular stock manufactured. But the stock must be dry—be sure of that! Most of us have had our troubles with glue softness by the sanding of partially dried stock, with the consequent blisters and open joints. Certainly it pays to give those extra hours of drying!

Blast drying has its adherents, and is certainly a good system where time is the chief consideration, but the plant must be installed in some place where it may be screened from the process floor proper, or trouble in the form of glue setting permanently will surely result. Hot air heated stock storage rooms are to be recommended, but not hot air heated process rooms. The hot air is naturally a valuable asset to drying, since it will readily evaporate any excess moisture in the stock and thus hasten the drying.

The foreman who is continually finding fault is apt to have many faults of his own, or else he is unfortunate in having faulty men under him. He should do some weeding out somewhere, because fault-finding is joy-killing and takes the life out of work and business.

The Modern Glue-Dissolver

ONLY within the last few years has any great attention been given to the equipment of the glue room, says Harry Hughs in "Veneers." For a century or more practically the same kind of utensils were used in the preparation of glue in the glue room. But suddenly it dawned upon those interested that glue is an important item, and the glue department an important part of the woodworking industry.

The old iron kettle is gradually being discarded, although there are a great many in use yet. Brass and copper glue-dissolvers are taking the place of the other. The first cost of the latter is much more than that of iron, but brass and copper pay in the end. They will last much longer, are much more easily kept clean, and glue will not deteriorate in them so quickly as in iron. The modern glue tank or dissolver gives evidence of scientific thought. The glue is completely inclosed, which prevents rapid evaporation of the liquid as well as the formation of a crust on top.

In the old-style open kettle one would have to break through this crust before he could get at the liquid glue. The agitator, or stirring apparatus, is a great improvement over the old way, or stirring the glue with a stick. This apparatus may be run by hand or power, according to the capacity of the kettle. With this the glue is made and kept of a uniform consistency throughout. In the old-style kettle it was very difficult to get the top and bottom uniform. The bottom would always be thicker than the top. But this trouble is done away with in the modern dissolver.

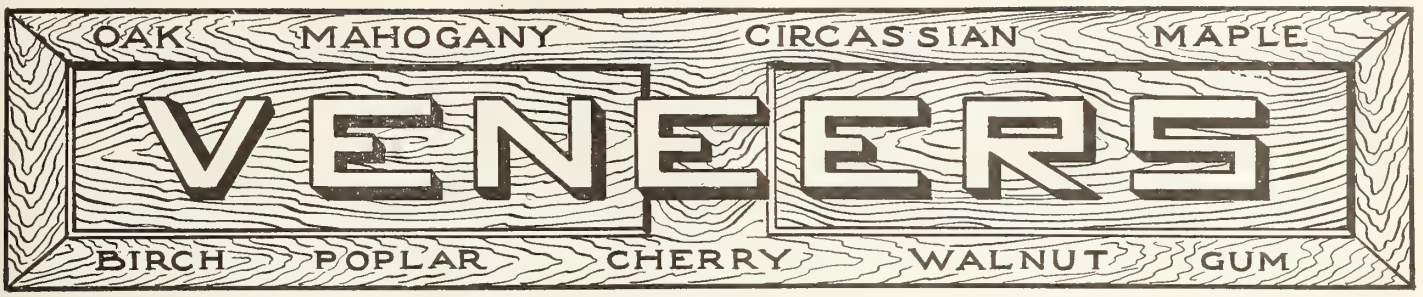
In selecting a glue-dissolver, do not select one that is high and narrow, but rather select one that is shallow and wide.

In the modern glue-heater there is not the same necessity for soaking glue over night as there was formerly, in order to have it ready for use early in the morning. And if one cares to have his glue ground fine before using, it may be put into the dissolver with the necessary water, and with the aid of the agitator be ready for use in a very short time.

Never think of buying a glue-dissolver without a thermometer attached, and see that the proper use is made of it. Your glue should be dissolved at a temperature between 140 and 150 degs. Fah., and should never be allowed to exceed that. The days of "cooking" glue are past, never to return. If you stand beside your dissolver and the thermometer registers a higher temperature than 150, take out your pencil and figure up how much money you are losing each hour. Estimate the number of pounds of glue you have in the dissolver, allow ½c. for each 10 degs. that the temperature exceeds 150; with the figures thus obtained multiply the number of pounds of glue you have in the dissolver, and the result will give you a fair estimate of the amount you lose each hour that the glue remains at that temperature, as a result of depreciation in quality. And this does not take into account the loss through defective work or failure of the glue to do its work.

A good way to overcome this difficulty would be to have a thermostat attached to the dissolver. This will operate automatically and insure uniformity of temperature. With this the danger arising from human fallibility and the necessity of keeping a close watch on the temperature are eliminated.

A sure way to find out whether a factory floor is smooth or not is to push a loaded truck over it.



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News of the Trade

The Canadian Box and Shook Mills, Sherbrooke, Que., have obtained a charter.

At Matsqui, B. C., the erection of a box factory is contemplated by T. Z. Smith.

The Glenemma saw mill, Vernon, B. C., has started up again, and is making apple boxes.

The shook factory of E. E. Woods, at Baie Verte, N. B., was entirely destroyed by fire recently.

D. E. Joron is the proprietor of a sash and door factory business registered at Pont Viau, Que.

The Paget Grain Door Company, of Goderich, recently shipped some three thousand shell boxes.

The Spiesz Furniture Company, of Hanover, have recently received an order for 10,000 shell boxes.

A. B. Cahoon, Cedar Rapids, Mich., visited Vancouver recently to look into the question of establishing a furniture factory.

Mr. T. G. Mason, founder and president of the firm of Mason & Risch, Limited, piano manufacturers, Toronto, has just celebrated his eightieth birthday.

The Cheese Box Company, Arnprior, Ont., has sold all its machinery, together with the patent rights, to the Dominion Box Company, capitalized at $90,000.

The Office Specialty Company, Newmarket, Ont., is engaged on a special war order for munition boxes, and the factory is running overtime to increase the output.

The Union Furniture Factory, Wingham, Ont., which has been idle for some time, is expected to be running again shortly. They will start on a large order for shell boxes.

The box factory of Allen & Norris at Grand Forks, B. C., has been operating at top speed for the last two months. More than 50,000 apple boxes have been turned out, while crates for smaller fruits numbered about 25,000.

A new company, known as the Lindsay Woodworkers' Company, Lindsay, Ont., are busy installing some three or four carloads of new machinery and building a dry kiln, in the hope of starting operations in a few weeks' time.

It is reported that the old piano and organ factory at Uxbridge, Ont., will soon commence operations in the way of turning out war munitions in the form of shell boxes and other supplies made of wood. As many as one hundred men may be employed.

Messrs. MacPherson & Cummins, of Sherbrooke, Que., are erecting a building adjacent to their sawmill in which they will put the woodworking machinery now housed in the sawmill building, and also add one or two other machines to enable them to increase their capacity.

The factory site, plant and equipment, valued at $16,000, as well as 289 wood mantels, 7,500 feet of hardwood lumber, veneers, cuttings, etc., valued at $3,102, owned by the W. A. Moore Company, Limited, in liquidation, Meaford, Ont., have been offered for sale by tender by G. T. Bissell, liquidator. Bids were received up to November 10th, and sale is to be closed on or before December 10th.

The Court of Appeal has upheld the judgment of the Supreme Court whereby the Stuyvesant Fire Insurance Company were held liable for the sum of $40,000 insurance on the factory of the Westminster Woodworking Company, Westminster, B.C., which was destroyed by fire more than a year ago. The company had made application for insurance only three days before the fire took place, and the insurance company declined to pay on the grounds that a policy had not been issued, and that the application was subject to either acceptance or rejection.

In an interesting pamphlet, "Maintaining a Precedence in Exposition Awards," the Hydraulic Press Manufacturing Company of Mount Gilead, Ohio, reproduce an interesting photograph of their exhibit of hydraulic presses and pumps, which obtained high honours in two departments of the Panama Pacific International Exposition. The prizes were: (1) Grand Prize from the Department of Agriculture for press machines; (2) Gold Medal from the Department of Machinery for forcing and bending presses and equipment. Interest in the pamphlet is enhanced by a view of the extensive factory of the Hydraulic Press Manufacturing Company, which is accompanied by a few facts relating to manufacture and equipment.

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Boring Machine, four spindle horizontal, Garden City.
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Dowel Machine Double, Crescent, power feed.
Dowel Machine, six heads, Fay & Egan, power feed.
Glue Heater, instantaneous, Zimmerman.
Glue Heater, new 5-gallon Wetmore.
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Glue Spreaders, 2 Francis 37 in., double roll.
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Planer, single 26 x 8 in. Rowley & Hermance.
Planer, single 32 x 7 in. L. Power & Co.
Planer, double 24 x 6 in. No. 4 Williamsport.
Planer, double 30 x 4 in. Whitney.
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Pulley Mortiser, Enterprise.
Ripsaws, self feed, No. 1 American and Graham.
One 42 in. Invincible triple drum Sander.
One 42 in. Young Bros. triple drum Sander.
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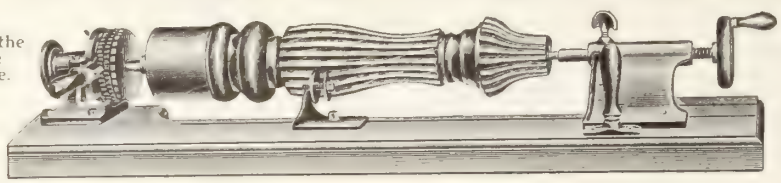

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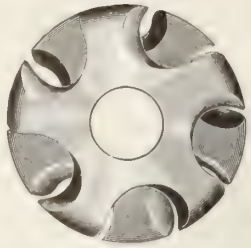

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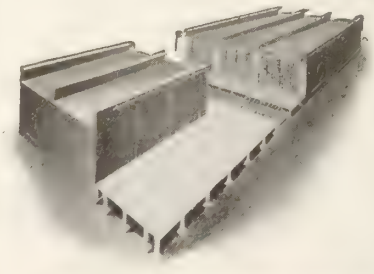

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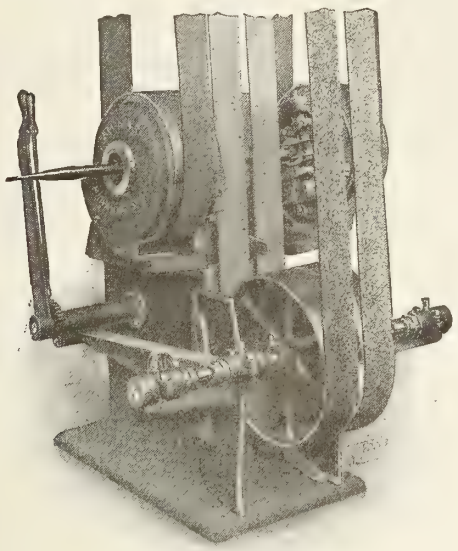

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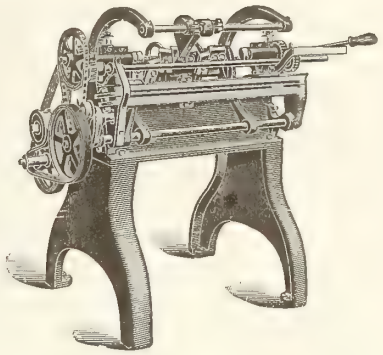

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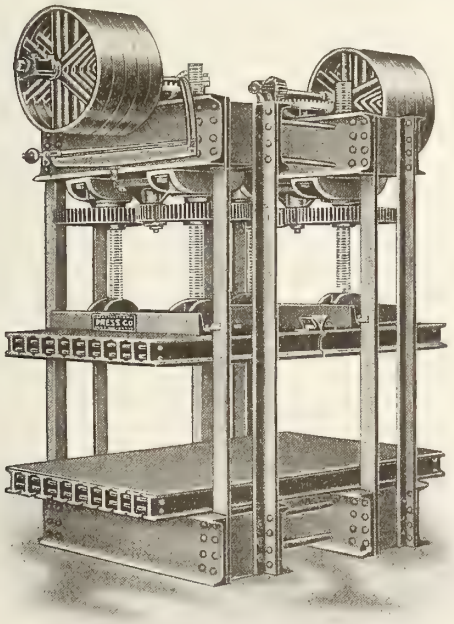

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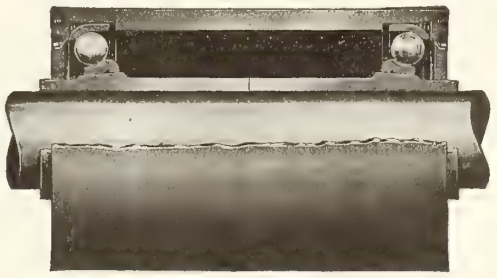

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Co., Berlin, Ont.
Pryibil Machine Co., P., New York City.
Shawver Company, Springfield, O.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Curtis Machinery Corporation, Jamestown, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

CASTERS
Foster, Merriam & Co., Meriden, Conn.

CLAMPS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
Jackson, Cochrane & Company, Berlin, Ont.
Palmer & Sons, A. E., Owosso, Mich.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

COMBINATION WOODWORKER
Hutchison Woodworker Co., Toronto, Ont.

CUT-OFF SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Co., Berlin, Ont.
Knechtel Bros., Limited, Southampton, Ont.
Ober Mfg. Co., Chagrin Falls, Ohio.
Pryibil Machine Co., New York.
Shawver Company, Springfield, O.
Simonds Canada Saw Co., Montreal, Que.

CUTTER HEADS
Berlin Machine Works, Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Shimer & Sons, Samuel J., Galt, Ont.

DADO HEADS
Elliott, W. A., Toronto.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

DOVETAILING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

DOWEL MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.

DOWELS
Knechtel Bros., Limited, Southampton, Ont.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
Morton Dry Kiln Co., Chicago, Ill.
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

DUST COLLECTORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

EDGERS (Single Saw)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

EXHAUST FANS
Invincible Blow Pipe Company, Toronto.
Sheldons Limited, Galt, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

FILLERS
Marietta Paint & Color Co., Marietta, Ohio.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Whitney & Son, Baxter D., Winchendon, Mass.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

FLUTING AND TWIST MACHINE
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

FURNITURE TRIMMINGS
Foster, Merriam & Co., Meriden, Conn.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.
Delany & Pettit, Limited, Toronto, Ont.

GRAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto, Ont.

GLUE
Coignet Chemical Product Co., New York, N.Y.
Delany & Pettit, Limited, Toronto, Ont.
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Jackson, Cochrane & Company, Berlin, Ont.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

GLUE JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Jackson, Cochrane & Company, Berlin, Ont.

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Berlin, Ont.

GLUE ROOM EQUIPMENT
Boomer & Boschert Company, Montreal, Que.
Perrin & Company, W. R., Toronto, Ont.

GLUING CAMP CARRIERS
Billstrom, Nels. J., Rockford, Ill.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Shimer & Sons, Samuel J., Galt, Ont.

GUARDS (Saw)
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

HANDLE THROATING MACHINE
Klotz Machine Company, Sandusky, Ohio.

HANDLE TRIMMING MACHINE
Klotz Machine Company, Sandusky, Ohio.

HANDLE & SPOKE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Co., Sandusky, Ohio.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitby & Son, Baxter D., Winchendon, Mass.

HARDWARE SPECIALTIES
Reflector & Hardware Mfg. Co., Chicago, Ill.

HARDWOOD LUMBER
Atlantic Lumber Company, Toronto.
Duhlmeier Bros., Cincinnati, Ohio.
Kraetzer-Cured Lumber Co., Moorehead, Miss.
Luehrmann Hardwood Lumber Co., St. Louis, Mo.
Mowbray & Robinson, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Powell Myers Lumber Co., South Bend, Ind.
Prendergast Company, Cincinnati, Ohio.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Knechtel Bros., Limited, Southampton, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

KNIVES (Planer and others)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Klotz Machine Company, Sandusky, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Whitney & Son, Baxter D., Winchendon, Mass.

MACHINE KNIVES
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MITRE MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MOULDINGS
Knechtel Bros., Limited, Southampton, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PAINTS & VARNISHES
Marietta Paint & Color Co., Marietta, Ohio.

PATENT SOLICITORS
Dennison, H. J. S., Toronto, Ont.
Lightfoot, Stanley, Toronto, Ont.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Shimer & Sons, Samuel J., Galt, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

PRESSES (Veneer)
Black Bros. Machinery Co., Mendota, Ill.
Jackson, Cochrane & Company, Berlin, Ont.
Perrin & Co., Wm. R., Toronto, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

RESAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

RIM AND FELLOE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Duplex Moulding Sander Co., Hornell, N.Y.
Elliot Woodworker Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SASH, DOOR & BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont
Shimer & Sons, Samuel J., Galt, Ont.

SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SAW GUARDS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Knechtel Bros., Limited, Southampton, Ont.
Pryibil Machine Company, P., New York.

SAW JOINTERS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SCRAPING MACHINES
Whitney & Sons, Baxter D., Winchendon, Mass.

SCROLL CHUCK MACHINES
Klotz Machine Company, Sandusky, Ohio.

SCREW DRIVING MACHINES
Reynolds Pattern & Machine Co., Moline, Ill.

SCREW DRIVING MACHINERY
Reynolds Pattern & Machine Works, Moline, Ill.

SCROLL SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.
Simonds Canada Saw Co., Montreal, P.Q.

SECOND-HAND MACHINERY
Pryibil Machine Company, P., New York.
Williams Machinery Co., A. R., Toronto, Ont.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pyribil Machine Co., P., New York.
Shawver Company, Springfield, O.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass.

SHARPENING TOOLS
The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Invincible Blow Pipe Company, Toronto, Ont.
Sheldons Limited, Galt, Ont.

SHELL BOX HANDLES
Vokes Hardware Co., Toronto, Ont.

SHELL BOX EQUIPMENT
Vokes Hardware Co., Toronto, Ont.

SINGLE SPINDLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.

SPRAYING APPARATUS
De Vilbiss Mfg. Co., Toledo, Ohio.

STAINS
Marietta Paint & Color Co., Marietta, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass.

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL SHELL BOX BANDS
Metallic Roofing Co., Toronto, Ont.
Vokes Hardware Co., Toronto, Ont.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Co., Chagrin Falls, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

TRUCKS
Standard Dry Kiln Co., Indianapolis, Ind.
Sheldons Limited, Galt, Ont.

TURNINGS
Knechtel Bros., Limited, Southampton, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Whitney & Sons, Baxter D., Winchendon, Mass.

UNDER-CUT SELF-FEEDING FACE PLANER
Fay & Egan C., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

VARNISHES
Ault & Wiborg Company, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

VENEERS
Central Veneer Co., Huntington, W. Virginia.
Evansville Veneer Co., Evansville, Ind.
Hay & Company, Woodstock, Ont.
Hoffman Bros. Company, Fort Wayne, Ind
Huddleston-Marsh Lumber Co., Chicago, Ill.
Ohio Veneer Company, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Robbins Veneer & Lumber Co., Buffalo, N. Y.
Waetjen & Co., Geo. L., Milwaukee, Wis.
Whisler, C. L., Hillsboro,' Ohio.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEERED PANELS
Hay & Company, Woodstock, Ont.

VENEER PRESSES (Hand and Power)
Canadian Boomer-Boschart Co., Montreal, Que.
Jackson, Cochrane & Company, Berlin, Ont.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Company, Montreal, Que.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

WOOD FINISHES
Ault & Wiborg, Toronto, Ont.
Marietta Paint & Color Co., Marietta, Ohio.

WOOD TURNING MACHINERY
Berlin Machine Works, Ltd., Beloit, Wis.
Shawver Co., Springfield, Ohio..

WORK BENCHES
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOODWORKING MACHINES
Jackson, Cochrane & Co., Berlin, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.

WHEELS, Grinding, Carborundum and Aloxite
The Carborundum Co., Niagara Falls, N.Y.

WOOD SCREWS
Robertson & Company, P. L., Milton, Ont.

WOOD SPECIALTIES
Knechtel Bros., Limited, Southampton, Ont.

WOODWORKING CUTTERS
Galt Knife Company, Galt, Ont.

YELLOW PINE
Prendergast Company, Cincinnati, Ohio.

Shell Box Boring Tools

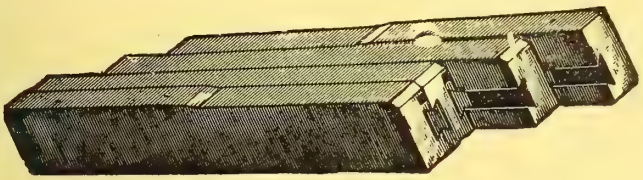
WE have designed a special line of tools for boring bridgings and end blocks, which have proved fast and accurate, saving time and rejected work. Each hole finished at one operation.

Write for information, or send us your dimensions and let us quote you prices. When ordering, be sure to state size of shank wanted.

Knechtel Bros., Limited, Southampton, Ontario

Making TABLE-SLIDES is a Specialty Business

For more than TWENTY-FIVE YEARS we have made TABLE SLIDES exclusively.
Our Factory is equipped with Special Machinery which enables us to make SLIDES,—BETTER and CHEAPER than the furniture manufacturer.



Canadian Table makers are rapidly adopting WABASH SLIDES

Because { They ELIMINATE SLIDE TROUBLES / Are CHEAPER and BETTER

Reduced Costs / **Increased Out-put** { BY USING **WABASH SLIDES**

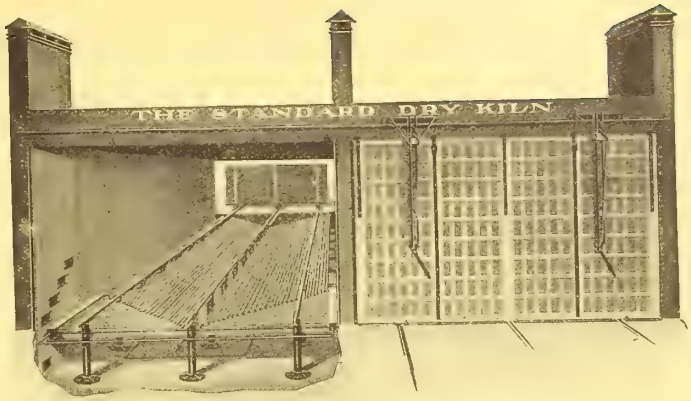
MADE BY

B. Walter & Company

Wabash, Ind.

The Largest EXCLUSIVE TABLE-SLIDE Manufacturers in America

ESTABLISHED-1887



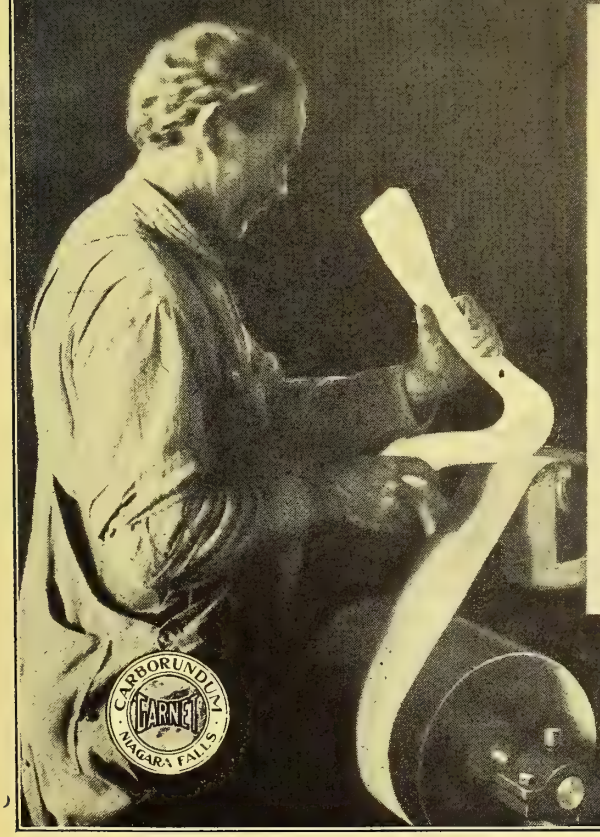
We are Prejudiced

—so, when we tell you that The Standard Dry Kiln will actually give you **better** results at **less** expense per year, you may think us overly enthusiastic.

Better Ask Users

They are not prejudiced. They know the **facts** from their own experience. Get the long list of furniture and hardwood manufacturers who use The Standard Moist Air Drying System, and ask **them** about it. For list and descriptive catalog, address: The Standard Dry Kiln Co., 1560 McCarty Street, Indianapolis, Ind.

THERE IS A DIFFERENCE



IF someone tries to tell you that Garnet Paper is just Garnet paper—that there is no difference—just remember that there is garnet paper and

Carborundum Brand Garnet Paper

The difference is there because Carborundum Brand is uniform—it is coated with the cleanest, sharpest of Garnet grain—the glue is of the highest grade—the process of manufacture the best.—Carborundum Brand Garnet Paper cuts faster—gives a better finish—lasts longer.

LET US SEND SOME SAMPLE SHEETS FOR TRIAL

The Carborundum Company

Niagara Falls, N. Y.

Boston New York Chicago Philadelphia
Cincinnati Cleveland Grand Rapids
London, Eng.

Marietta Means Practical

"I like those Marietta goods. They're made as though the folks that made 'em expected to use 'em themselves."

¶ That's true. In fact, we were users before we were stain makers and it was our appreciation of the needs of the finishing trade that led us, years ago, to go into the manufacture of finishes.

¶ We have built up our present large business on the merits and practical working qualities of "Marietta" products.

The Marietta Paint & Color Co.

Marietta, O.

CANADIAN WOODWORKER
and
Furniture Manufacturer

Shell Box Number

Toronto
December
1915

"Leather like gold has no substitute."

If your belts are slipping your entire plant is slipping, men included. Time is wasted. For maximum efficiency you need a strong and extremely pliable leather belt that has a pulley gripping surface. In short, you need "Crown" Planer Belting. This belting is ideal for use on planers, matchers, etc., where it must take short turns over small pulleys, and carry a heavy load.

"CROWN" Planer Belting

The leather used in "Crown" Planer Belting, which we tan ourselves, is carefully selected and no weak spots are used.

The small pulley is the acid test of a leather belt. "Crown" Planer makes good under such a test.

Established since 1876.

Write us for prices.

Made in Canada

Sadler & Haworth

Tanners and Manufacturers

Toronto	St. John, N.B.	MONTREAL	Winnipeg	Vancouver
38 Wellington St. E.	189 Prince William St.	511 William St.	Galt Building	217 Columbia Ave.

Shell Box Handles

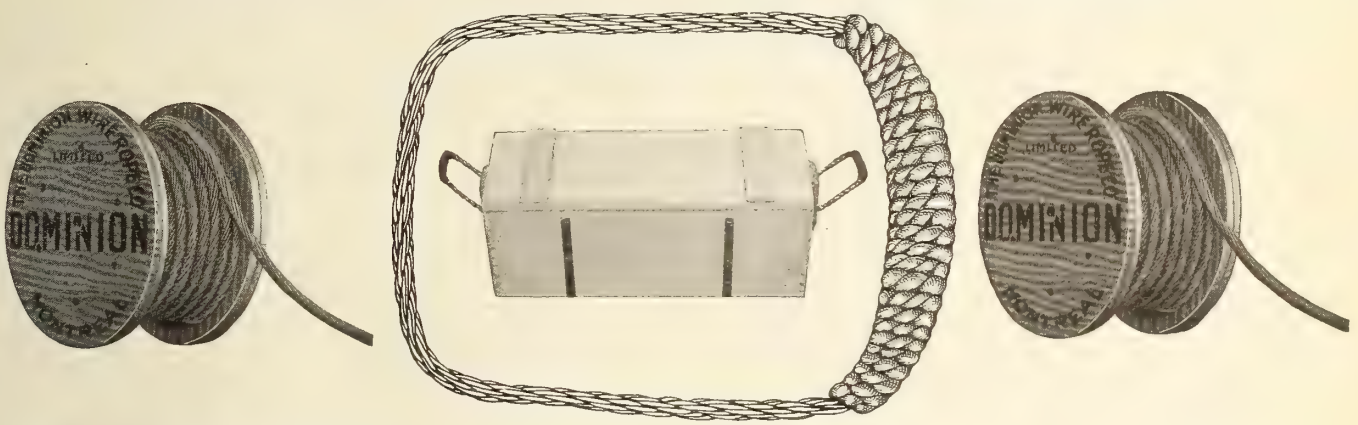
Made in Canada from

"DOMINION" WIRE ROPE

Made in Canada

Made in Canada

Approved by The Shell Committee



We are the originators of the

Marline Covered Handgrip

Made in Canada

Heavy Stock on Hand

Shipments Made

to Suit Customers

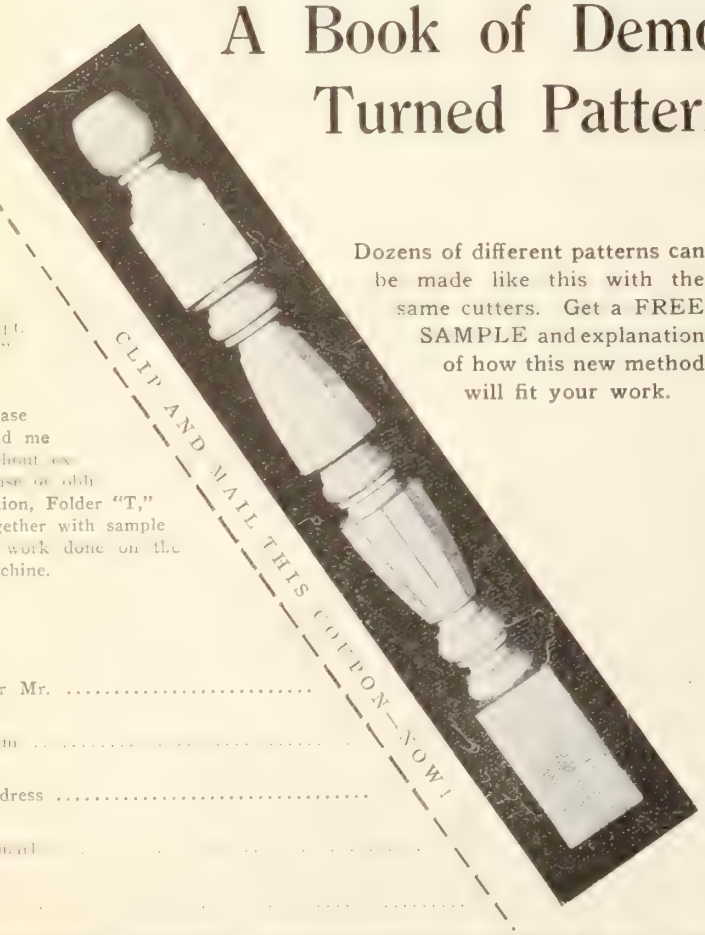
Made in Canada

The DOMINION WIRE ROPE CO., LTD., Montreal

Branches: St. Catharines, Ont., and Winnipeg, Man.

Get this Book *Mail the Coupon*

A Book of Demonstrations on Turned Patterns—FREE



Dozens of different patterns can be made like this with the same cutters. Get a FREE SAMPLE and explanation of how this new method will fit your work.

MAKING Period Patterns or any other designs at but a fraction of the cost of hand turning is your opportunity. It lies with this new machine method illustrated above.

Turnings can now be made "a-few-at-a-time" and in large variety of patterns with machine speed and accuracy by an exceedingly small investment.

The book points out the usefulness and application of the method on work similar to yours. You cannot fully realize the machine's advantages without getting a copy.

Fill out and mail the Coupon now. Learn what others are doing with this new machine method.

CLIP AND MAIL THIS COUPON—NOW!

Dept. "A"

Please send me without expense or obligation, Folder "T," together with sample of work done on the machine.

For Mr. .....

Firm .....

Address .....

Remarks .....

Berlin Machine Works
Hamilton, Ont. Limited

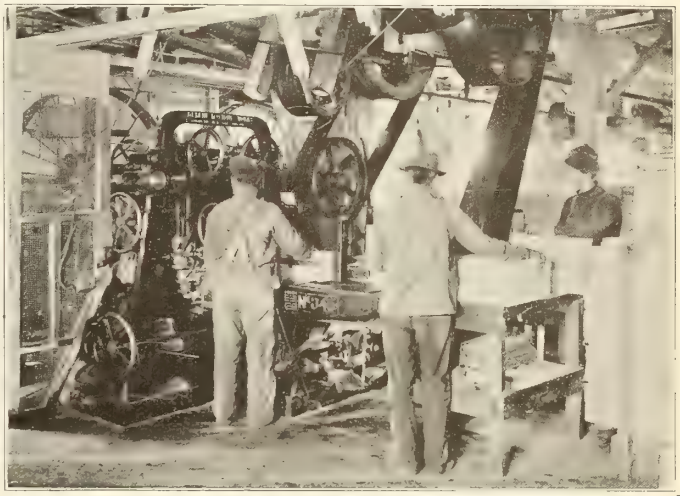
U.S. Plant—Beloit, Wis., U.S.A.

Speed Up Production With Hopper Feed

DON'T try to handle large contracts issued for a definite date of delivery or with a dangerously narrow margin of profit without first learning how these

Fast Feed Berlin Box Factory Units

render the handling of such orders profitable by reducing operations to the least possible number and making even these near-automatic.



The Berlin No. 345 Twin Horizontal Hopper Feed Resaw will place your box manufacture on a higher productive basis. The entire width of the hopper may be kept full and the saw cutting full continuously. It reduces ordinary operations 50%.

Another Box factory unit is the Berlin No. 185 Double Surfacer with Hopper Feeding Attachment for short stock. With this machine, shook stock that has been equalized in the rough may be double surfaced in large quantities at astonishingly rapid rates.

Hopper Feed maintains a steady all day production and never lies down on a job. You can estimate with extreme accuracy your cost of production if your machines are hopper fed, for the machine—not the operator—sets the pace and determines the day's output.

If your orders are not paying you the profit you estimated, or if you would inform yourself of a way to further increase your percentage of profit, tell us your requirements. There's doubtless a machine for the purpose.

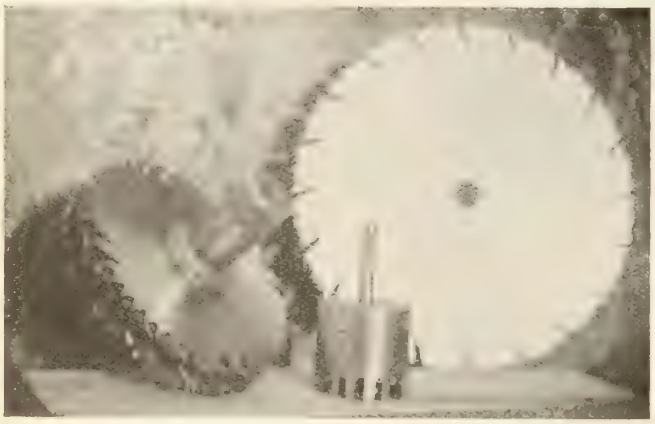
Berlin Machine Works, Ltd.
HAMILTON, ONTARIO

U.S. Plant—Beloit, Wis.

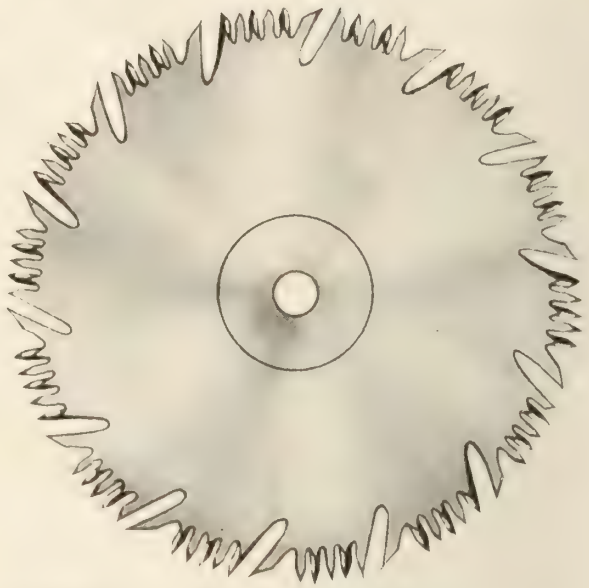
MADE RIGHT—RIGHT IN CANADA

Berlin

Shell Box Saws



The above illustration shows three Radcliff specials for shell box work. On the left is shown dado-head, in the centre special cylinder for cutting holes in the shell box trays; this saw is fitted with a spring to eject the core. On the right is a combination tooth planer saw.



Hollow Ground Planer or Mitre Saw

Special Groover
for cutting with or across the grain.

These Saws will cut with or across the grain with a smoothness that makes further finishing unnecessary.

Write us for prices on these Labor-Saving Saws.

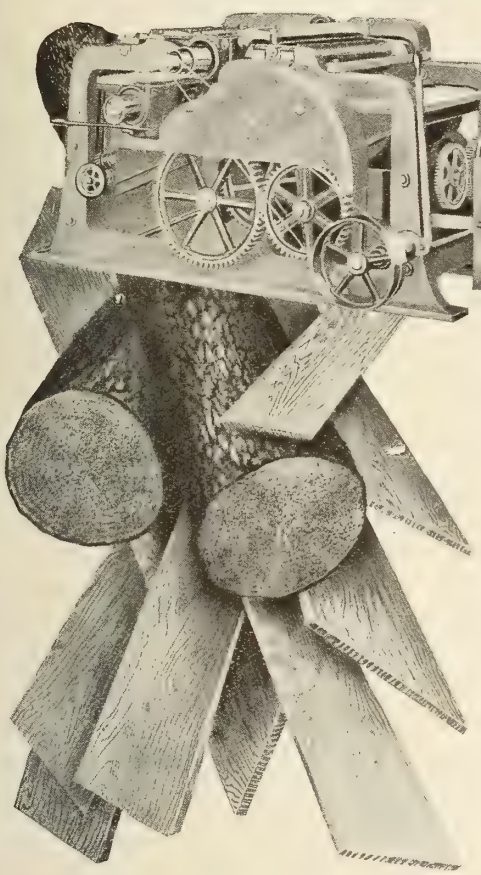
Round Face Groover
for cutting channels for rope handles in cleats.

Aloxite Saw Gumming Wheels, Hoe Bits and Shanks, Band Saws, Inserted Tooth Saws, Shingle Saws, Machine Knives.

THE RADCLIFF SAW MFG. CO., LIMITED

550 Dundas Street - - - TORONTO, Ont.

Agents for L. & I. J. White Co. Machine Knives



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The Whitney Planer

Single or Double Surfacer

Standing up to the most extreme pressure, day after day, producing always the same uniformly good surfacing on whatever kind of lumber is brought to it, doing this work at a speed that counts, counts up in lineal feet and profits earned; a Whitney Planer will pay you better as an investment, first and last, than any other planing machine you can buy.

We equip your machine according to the work you do, with square cylinders and two ordinary knives, or with four knives, or with round cylinders and four thin high-speed steel knives; sectional rolls and steel sectional pressure bars, or flexible steel pressure pads.

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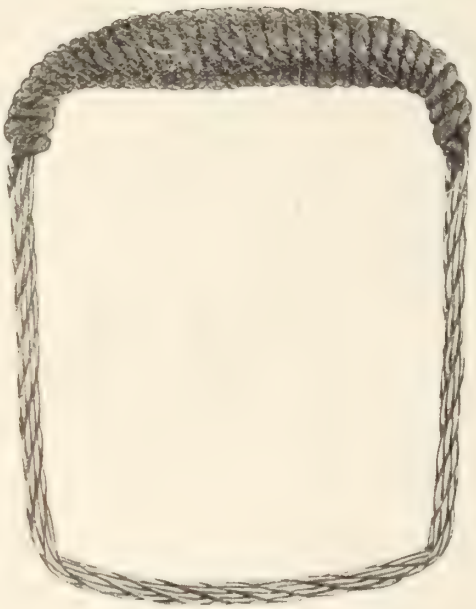
WIRE HANDLES



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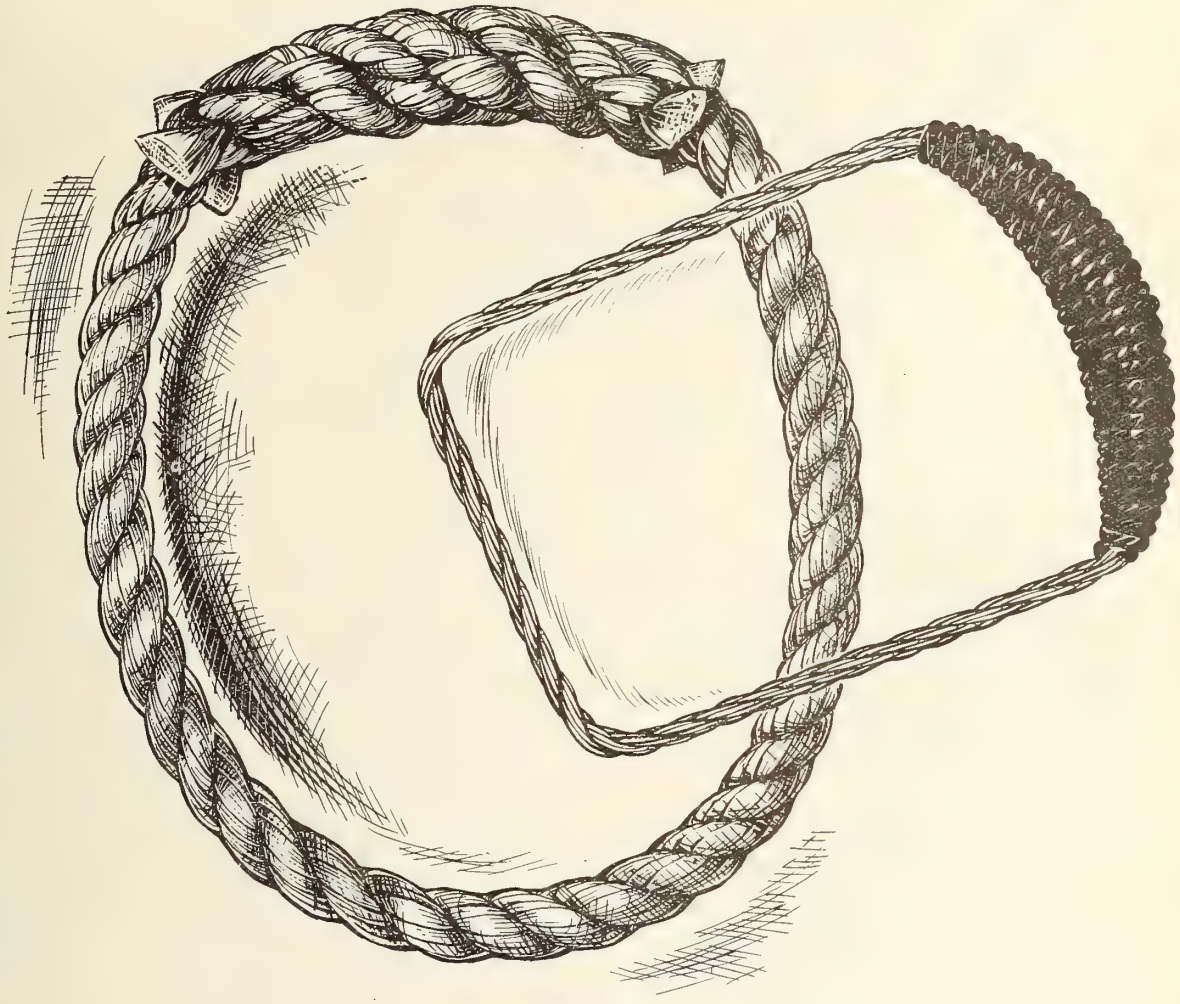

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Let us know your requirements. Lowest prices upon application.

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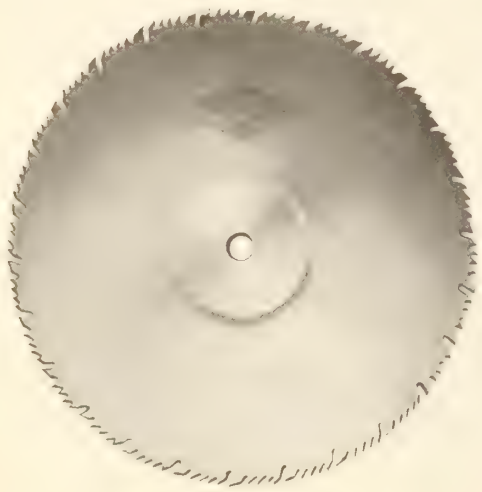
Shell Boxes made in Canada
and sawn by Saws made in Canada—

SIMONDS SAWS

at our Montreal factory are made of every description and for all purposes—



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Lock Corner Cutters
Mitre Saws
Novelty Saws

In addition to this unexcelled line of saws of highest quality we make all kinds and sizes of Planer and Moulder Knives.

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ALWAYS RELIABLE
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Established 1825 Limited

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"LION BRAND"

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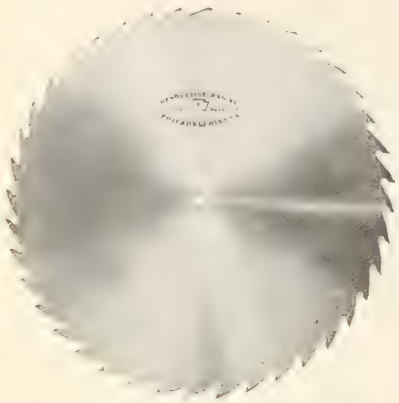
Officially approved and guaranteed to pass all inspections

Where ECONOMY is a factor—use "LION BRAND" PROMPT shipment guaranteed



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mean minimized repair, replacement and out-of-service expense and maximum output of a high grade product.

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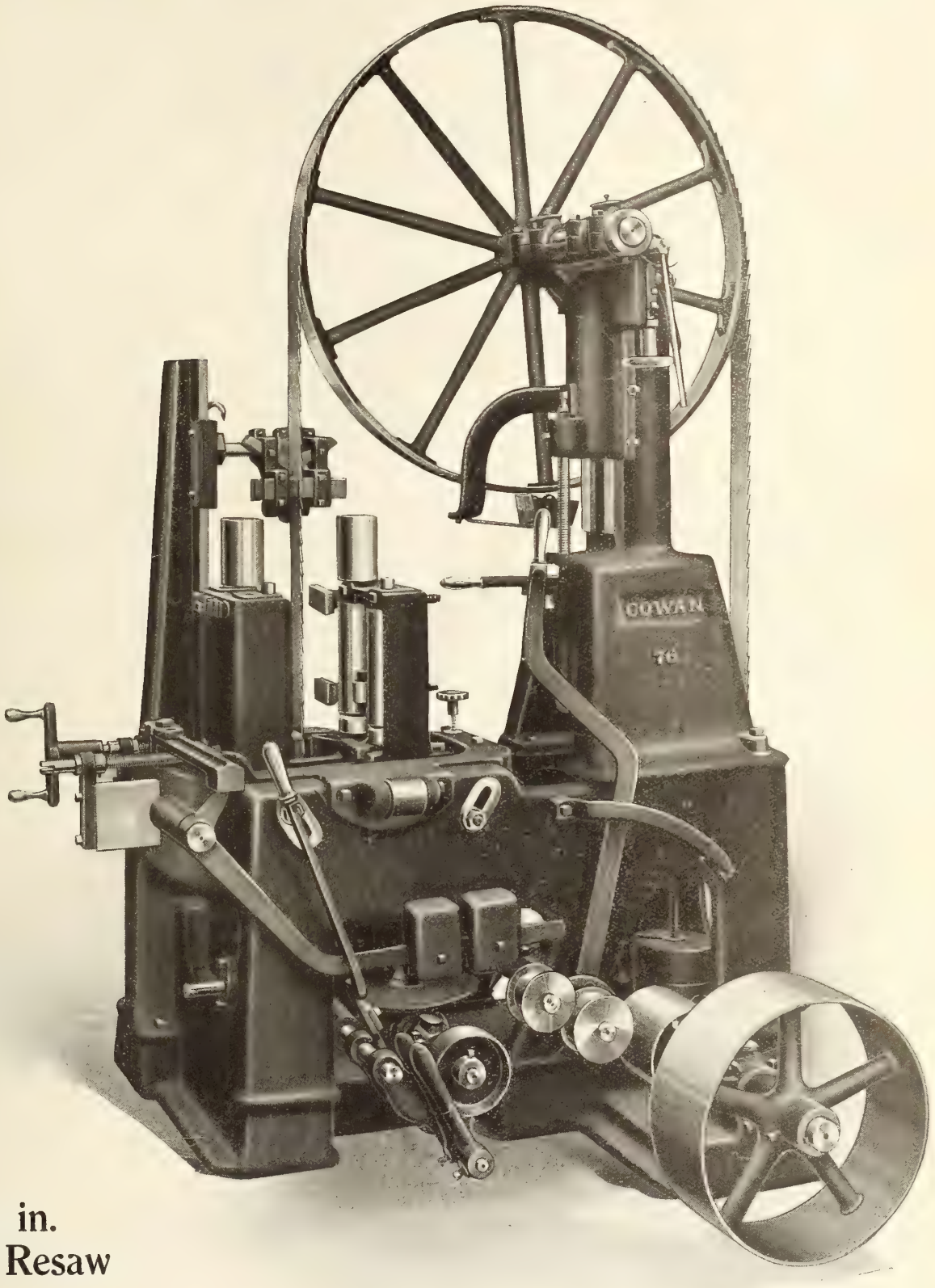


48 in.
Band Resaw

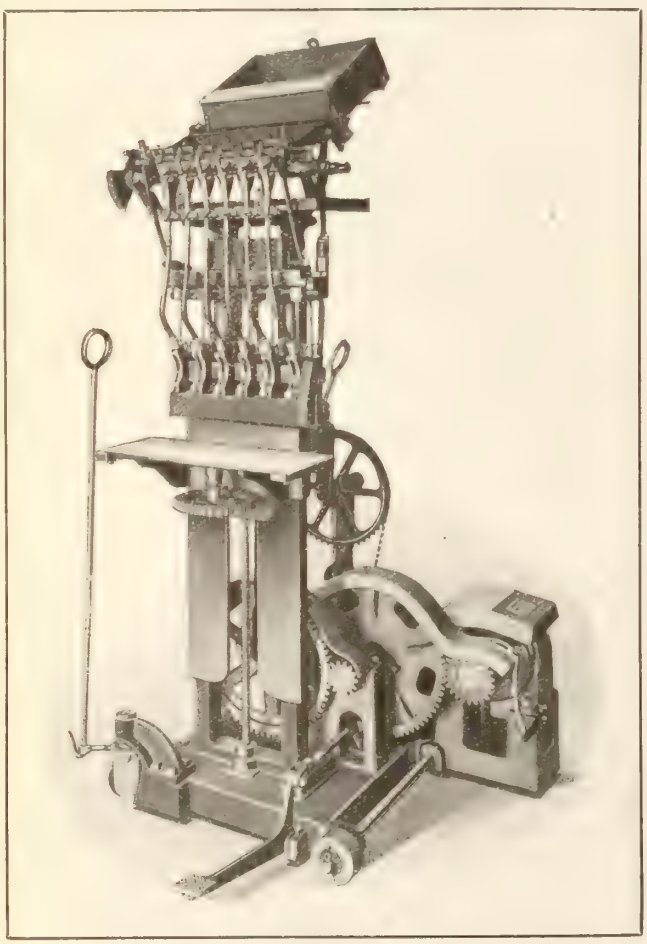
Manufacturers of Woodworking Machinery suitable for Box Factories, Sash and Door Factories, Planing Mills, Furniture Factories, etc.

Specialists in Shell and Ammunition Box Equipment

COWAN & COMPANY OF GALT LIMITED, GALT, ONTARIO, CANADA

Box Nailing Machines

The Box Nailing Machine here illustrated drives six nails from 1″ to 1¾″ long. It is motor driven and mounted on wheels and is suitable for nailing boxes that are not over 15″ wide, 15″ deep, and of any length. This is a size used extensively by the canning trade, soap makers and fruit packers.



We make Nailing Machines of all sizes driving from 1 to 30 nails, doing all sorts of work that can be done with a Nailing Machine, making boxes from 2 in. square up to a size large enough to box a piano.

Many machines made by us are now being used in making boxes in which to ship shells, shrapnel, and other war munitions.

We can supply machines of any style illustrated in our catalogue, either for belt or motor drive.

A catalogue illustrating sixty different styles and sizes of Box Nailing Machines will be sent upon request

Estate of William S. Doig

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Medal of Honor awarded at Panama Pacific International Exposition, 1915, Grand Prize at St. Louis, 1904, and highest awards at Buffalo, Charleston, Paris and Columbian Expositions.

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Shell Box Machinery

We build a complete range of high-grade Wood Working Machinery.

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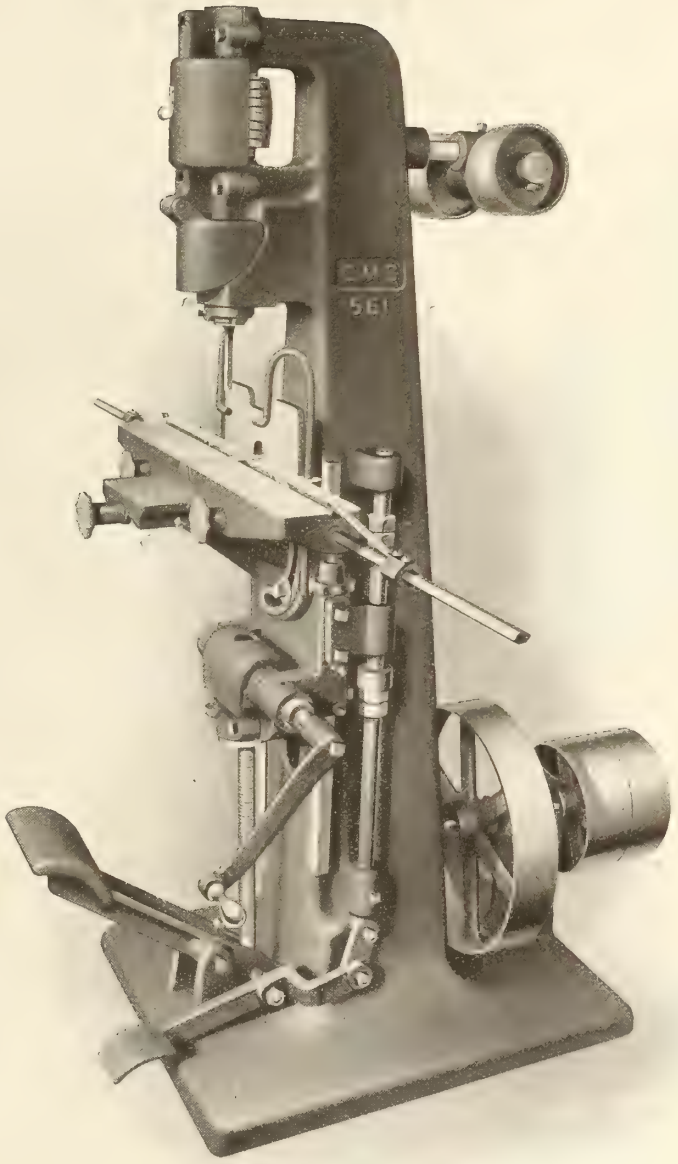

No. 561 Hollow Chisel Mortiser.

For Shell Boxes we have designed and built a complete line of special machinery that will pay you to investigate.

Illustrations and full information of our product gladly sent on request

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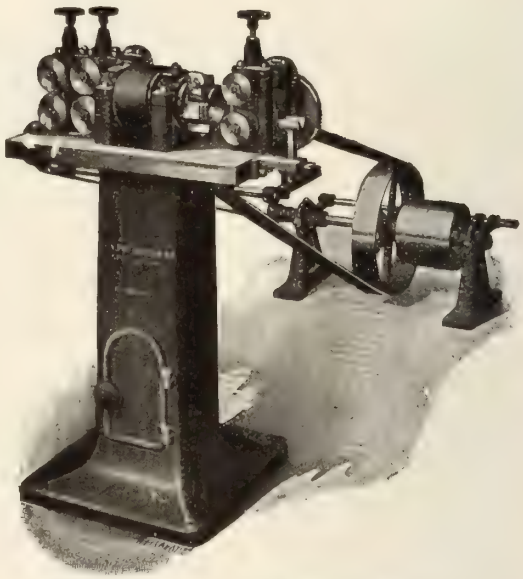
FAY-EGAN "LIGHTNING" Machines for Shell Box Manufacture

No. 201 Gang Dovetailer

Unequalled for use where the Dovetailed corner box is used. Cuts regular ammunition box dovetails, blind and regular furniture styles. Made with nine, twelve and fifteen spindles. See article in reading pages.



No. 7 Power-Feed Rod Machine

For making plugs. Made either power or hand feed, and to cut plugs or rods up to 3 in. diam. Special chucking heads furnished for tapering plugs.

Large stocks and immense manufacturing facilities enable us to make prompt deliveries of all models.

J. A. Fay & Egan Company

Established 1830

Also

DOUBLE SURFACERS for finishing the lumber two sides in one operation.

BAND RESAWS, single or twin, for resawing to proper thickness.

MOLDERS AND MATCHERS for surfacing and chamfering battens.

DISK SANDERS for knocking off corners.

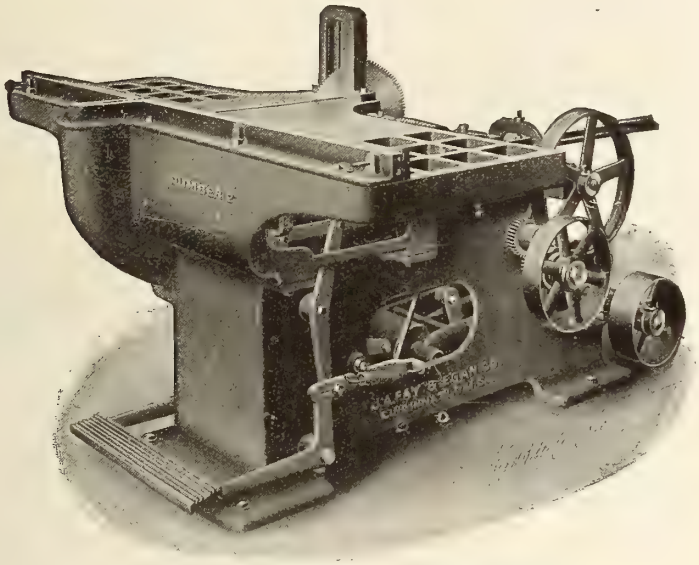
VARIETY SAWS for cutting rope grooves.

World's Oldest and Largest Manufacturers of Woodworking Machinery

The "LIGHTNING" Line

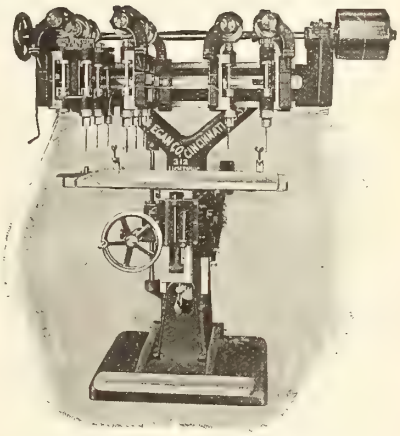
153-173 W. Front St.
Cincinnati,
Ohio

Standard Machines that will be valuable to you in your regular work when the shell box business is ended



No. 2 Automatic Cut-off Saw

For cutting stock to length. Long recognized by the box makers as the machine of greatest output and most economical operation in this class of work.



No. 312 Multiple Borer

For boring in one operation all screw holes in one side or batten. Can be arranged to bore any number of holes up to 21 either in or out of line.

Let us figure on your requirements—use the coupon — your letterhead, or telegraph us.

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Send us Bulletins, quote price and delivery on items checked.

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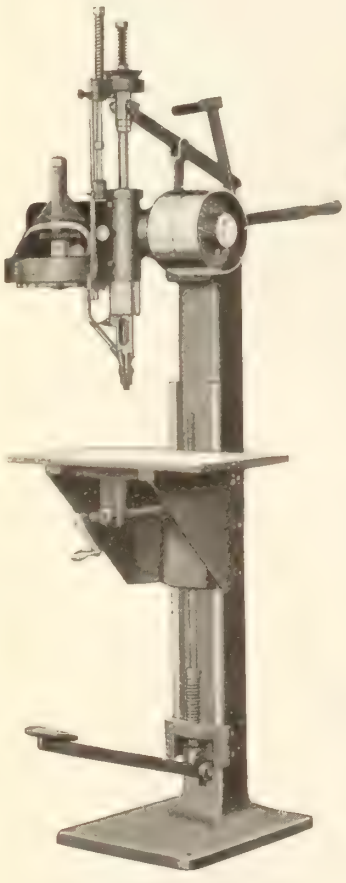
Profit or Loss—Which?

Driving screws by hand is a costly, laborious method. The box manufacturer who fails to take advantage of the modern way will necessarily have a higher cost of production. In these days of keen competition and close prices his profit is sometimes wiped out entirely.



No. 2 Standard Type Automatic Screw-Driving Machine.

Reynolds Screw Driving Machines

for use on Shell Boxes

are guaranteed to produce better work and at a big saving over the slow, inefficient hand and brace screw-drivers. They are rapid and simple in operation. Screws are thrown into a hopper and require no further attention. Can be set as rapidly as holes can be bored. The work is placed on the table and handled exactly as if boring were to be done instead of screw setting. When the work is in position, depressing the foot lever brings down the spindle, driving the screws home, at which point out patented spindle construction allows the bit to stop, preventing the over-running of screws or marring of screwheads or work.

Spindle runs from 800 to 1200 r.p.m.

The No. 2 Standard Type, shown herewith, is particularly suited for placing the screws in the straps of shrapnel boxes. It may be fitted to drive, without change or adjustment, any three consecutive sizes flat or round head, or two sizes filister head, No. 6 to 14 inclusive, wood or machine screws, or three sizes flat or round head, or two sizes filister head machine screws up to No. 20. All the above up to 1½ inches long if smaller than No. 10, or up to 1¾ inches long, No. 10 or larger. Fitted with boring attachment if desired.

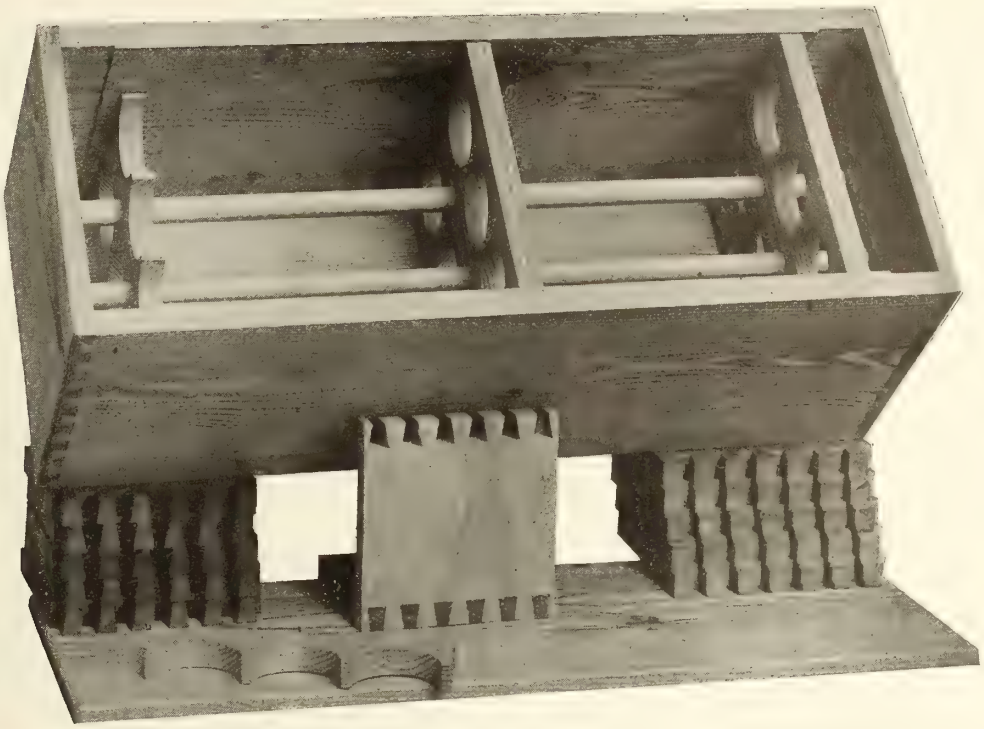
One customer has sixty-eight machines
Let us quote on machines suitable for your work

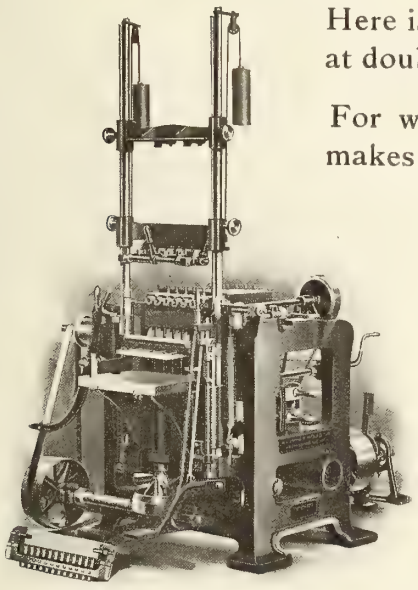
Catalogue on request

Reynolds Pattern & Machine Co.

101-103 Third Ave., Moline, Ill., U. S. A.

Shell Box Dovetailer





Here is a machine that will cut clean accurate dovetails at double the rate of any other dovetailer.

For work on Shell Boxes it is the ideal machine, as it makes the specified open end dovetail.

It is made entirely of iron and steel, possesses every convenience in the way of adjustment, has every provision for taking up wear, and is fully guaranteed to be of the best material. We also make mortising, sanding and boring machines, and special cutters for boring partitions in Shell Boxes.

Write us, we are in position to help you

Wysong & Miles Co.

Corner Fulton and Lee Streets

Greensboro, N.C., U.S.A.

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We Specialize

in furnishing

BOX MACHINERY

Also all other kinds of

WOOD-WORKING MACHINERY

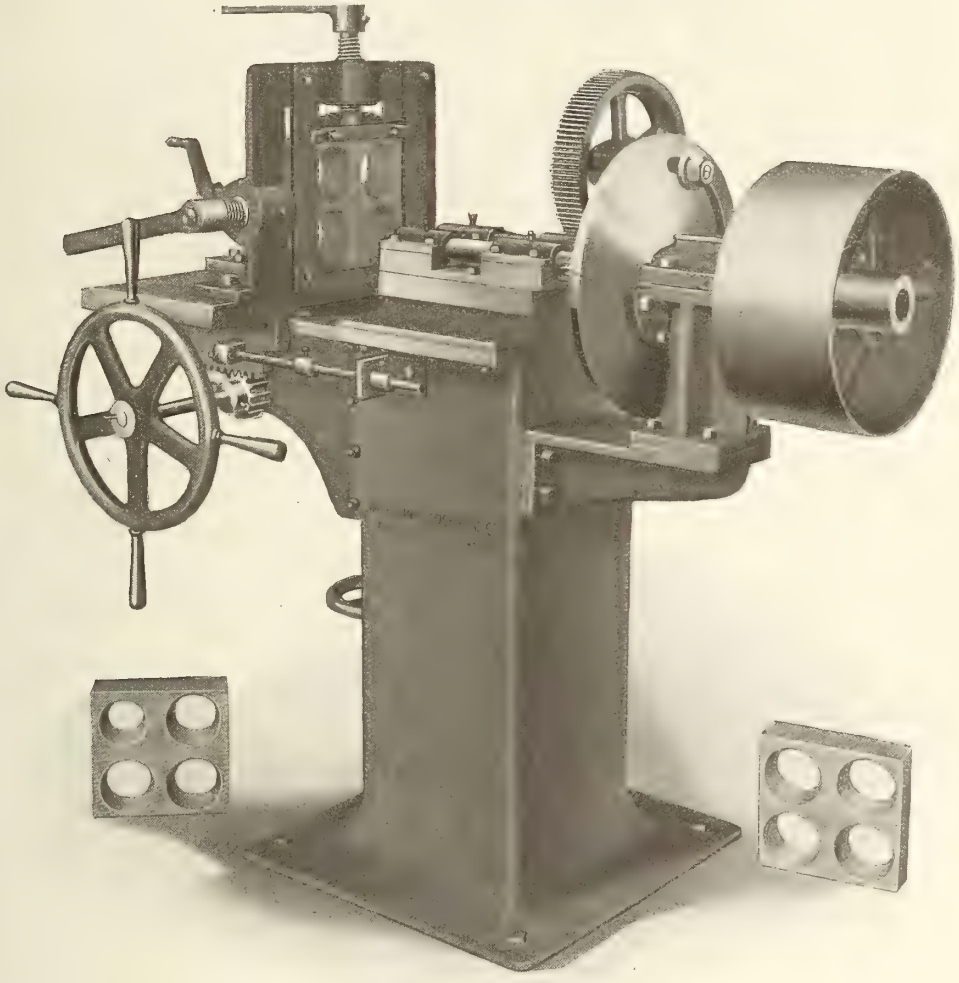
TWENTY years actual, first hand, working experience in box factories, sash and door factories and planing mills enables us to give you the intelligent service all buyers desire. We have the knowledge and we have *the* machinery.

Buy from people who will understand your requirements

J. L. NEILSON & CO. - Winnipeg, Man.

Shell Box Machinery

Special Two Spindle Boring Machine



Designed for boring the large holes in the internal fittings of the 18-lb. 4-round Ammunition Box.

Machine is heavily constructed, having large steel spindles and a heavy steel gear.

With the use of this machine you can turn out a large number of blocks a day. We have over 50 of these Borers in operation on Ammunition Boxes.

Note the special clamp for holding the blocks, also the positive rack feed and the stops for guaging depth of cuts.

Increase Your Output of Shell Boxes

Particulars and prices gladly furnished for this and other shell box machines.

We also manufacture a complete line of

Boring and Dovetailing Machines

for Shell Box Work

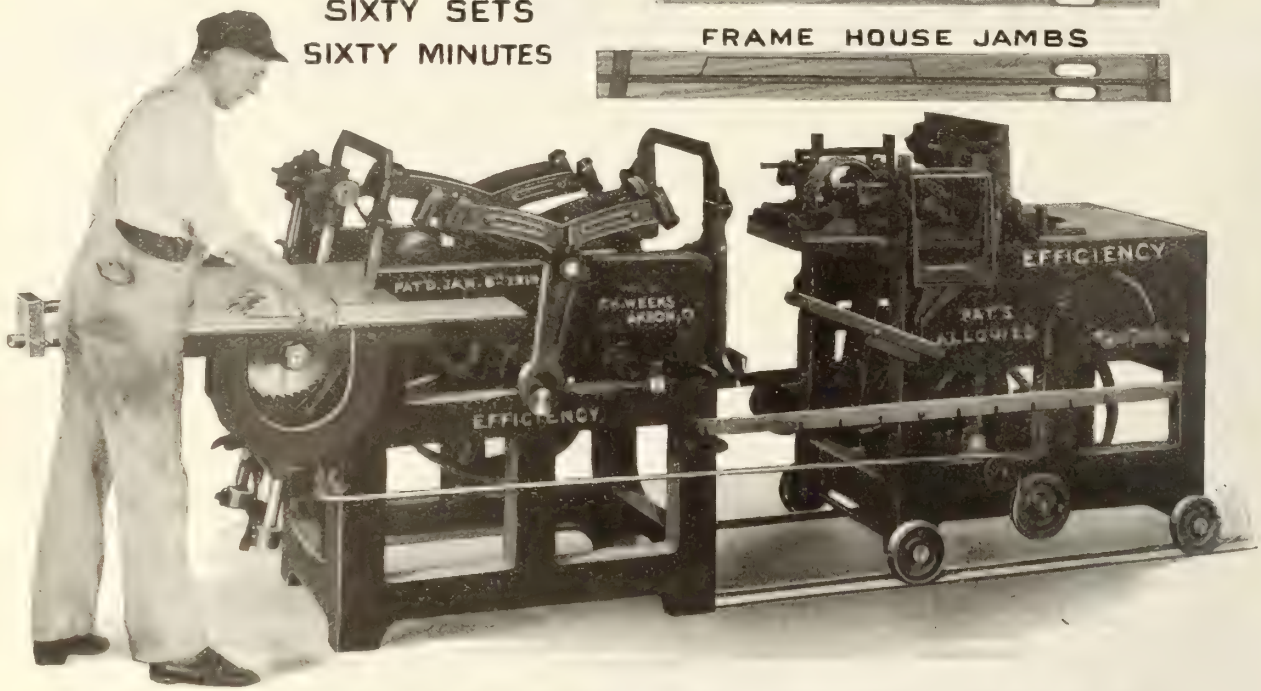
Jackson, Cochrane & Company

BERLIN - ONTARIO

ONE OPERATOR
SIXTY SETS
SIXTY MINUTES

BRICK HOUSE JAMBS

FRAME HOUSE JAMBS



THE EFFICIENCY WINDOW FRAME MACHINE

A new style machine which **REDUCES LABOR COST FULLY 60%.** Works automatically—one man can turn out sixty sets of pulley stiles an hour. Cross cuts the ends of pockets, routs the pulley mortises and dadoes the head and sill gain, automatically, while the operator slits the pockets. You take no chance—write us.

THE F. H. WEEKS LUMBER COMPANY - AKRON, OHIO

Morehead
Back to Boiler
SYSTEM

They Saved 25% in Fuel and 50% in Repairs—

So writes Mr. William H. Turner, Secretary and Treasurer of the Easton Furniture Company, of Easton, Md., after giving the "Morehead" System a thorough trial.

Until you are draining the condensation from your kilns and returning it—every drop—to the boilers at the **original temperature**—
—you are wasting heat units that cost you DOLLARS to produce.

Rejuvenate Your Steam Plant

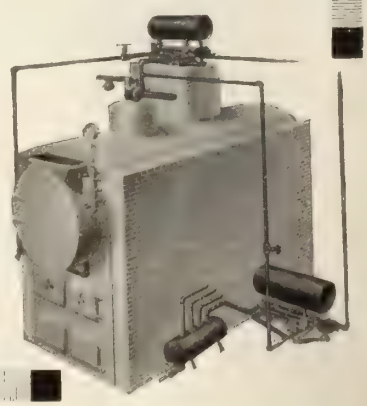
by making the inexpensive "Morehead" System a part of it.

Save fuel by bringing the pure condensation directly back to the boilers HOT!

Save fuel by eliminating for ever the necessity for the wasteful and constantly out-of-order steam pump.

The simple, easily installed "Morehead" System will much more than pay for itself the first year of use.

The Morehead Book shows actual photographs of interesting installations. Write for your copy now.



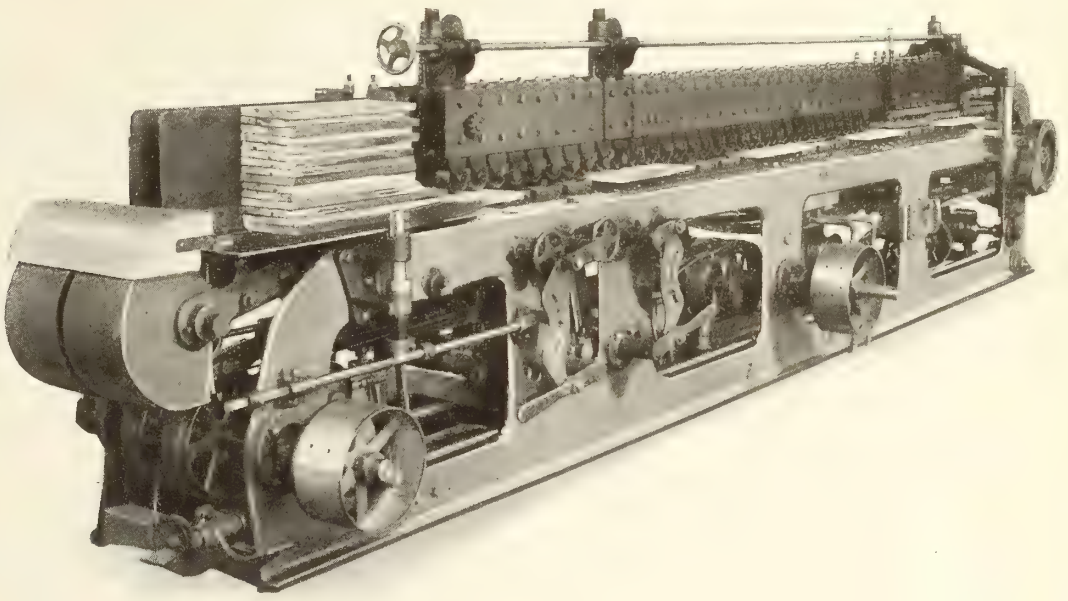
Canadian Morehead Manufacturing Co.
Woodstock Dept. H. Ontario

One Piece Sides and Ends for SHELL BOXES

From Narrow (Cheaper) Lumber at a Low Rate per 1000 feet on the

LINDERMAN AUTOMATIC DOVETAIL MATCHER

Samples on Request



THESE CONCERNS USE LINDERMAN MACHINES:

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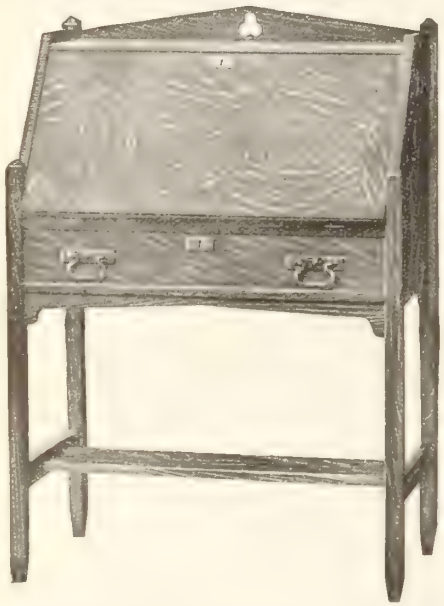
Canadian Linderman Company

Woodstock, Ontario

Muskegon, Mich. Knoxville, Tenn. New York, N.Y.

Perkins Vegetable Veneer Glue



Ladies' Desk manufactured by The D. Hibner Furniture Co., Limited, Berlin, Ont., in which Perkins Glue was used.

IS A

Uniform, Guaranteed Patented Glue

¶ We have, during the past eight years, built up a large volume of business and maintained it, because we sell only

HIGHEST QUALITY

¶ Our list of customers proves the statement that a very large per cent. of the highest quality furniture, including office and household furniture, also doors, interior trim, etc., are built up with Perkins Glue.

¶ Be sure you have *Perkins Quality*—absolutely uniform.

¶ We will demonstrate to your satisfaction in your own factory

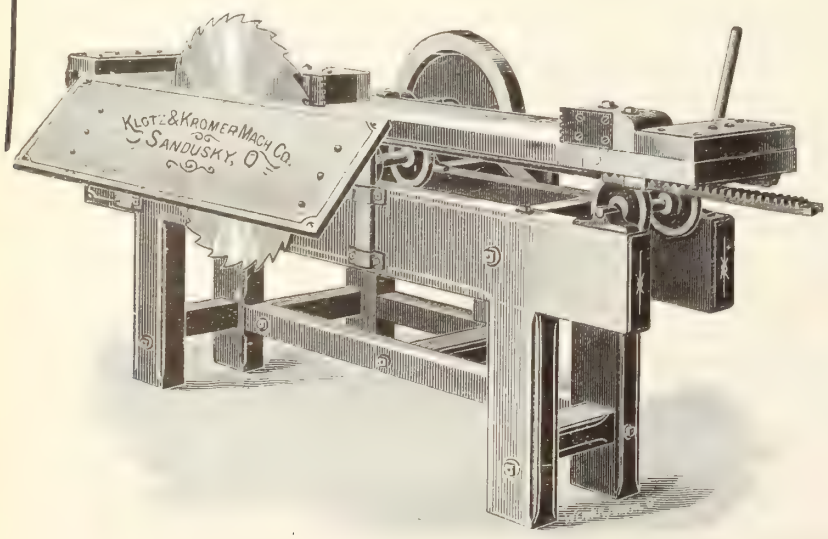
Originator and Patentee of Perkins Vegetable Glue.

PERKINS GLUE COMPANY

809-810 J. M. S. BUILDING, - - - - SOUTH BEND, INDIANA

Here It Is!

The Shaping Saw Machine That Saves Time



THE Klotz Shaping Saw Machine is specially made and designed for cutting out Shapes or Blanks for Handles, Spokes and similar work, from planks or slabs after they are cut from the log.

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Klotz Machine Co.

Sandusky, Ohio

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As a result of the War, new opportunities are presenting themselves for Canadian Industry. It is part of the purpose of our Service Department to collect data, prepare estimates and give general information on means, methods and machinery for establishing the new industries on a sound, practical basis.

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Toronto, Canada Limited

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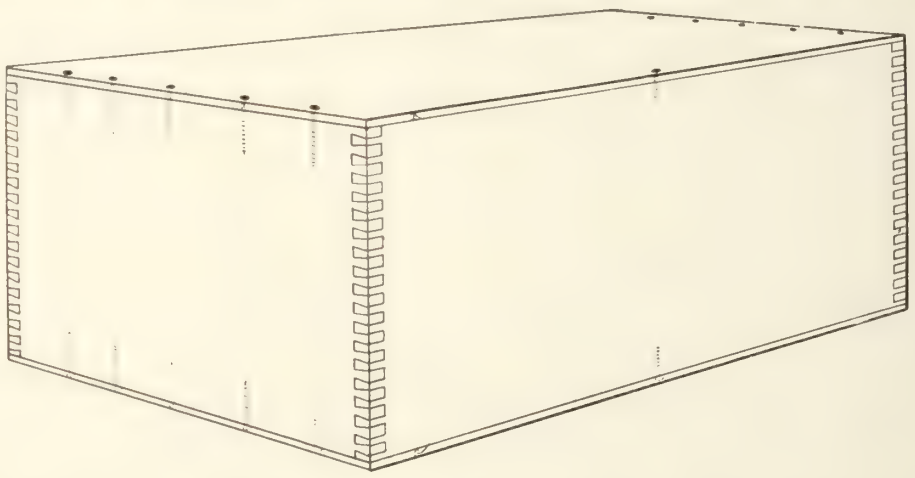
2 x 4 and up x 6/22 150 M

Spruce Box and Culls
4/4, 5/4 and 8/4 x 4 and up x 6/16 700 M

The above stock is dry and much of it is assorted widths.



Shrapnel Boxes are Strongest, Smoothest and Cheapest when made on WEDGE DOVETAIL BOX MACHINES

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The cutters are hollow ground saws, running on ball bearings.
Our Dovetail Squeezer is the only machine built strong enough to frame up the heaviest shrapnel box successfully.
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Canadian Woodworker

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Vol. 15 **December, 1915** **No. 12**

A Brighter Outlook for the Woodworking Industry

The manufacture of what are commonly called shell boxes, i. e., boxes for the accommodation of shells and fixed ammunition, has become a very important part of the woodworking industry. This number of the "Canadian Woodworker and Furniture Manufacturer" is designated a Shell Box Number. Most of the articles deal with the making of shell boxes, and we have endeavored to give, as far as possible, information of value to the box maker. The making of a box may, and does, seem a simple matter, yet it is most essential for the manufacturer, if he be successful, to have his plant properly laid out, to study efficiency and economy in production, to employ the best labor-saving equipment, and to know what his actual factory costs are. These are some of the subjects discussed in this issue. The Imperial Munitions Board, contrary to the methods of the original Shell Committee, have recently invited competitive bids for shell boxes, and doubtless further large orders will be placed. The extent of future orders must depend upon the duration of the war, but it is reasonable to anticipate that for some months to come the woodworking industry will feel the stimulus of shell box contracts.

The aggressive steps that are being taken to promote our export trade is a favorable sign. The Canadian Timber Products Association, recently organized, has for its object the securing of a proper share of the business for portable houses, sash and doors, interior finish, etc., that will come as a result of the devastation in European countries. This will be a tremendous amount, and there is surely no country more favorably situated to supply the requirements than the Dominion of Canada. Portable houses will represent a large trade, and we feel that Canadian woodworking firms can lay down the finished material in Europe as cheaply as it can be had from any other source. The same can be said of other woodworking lines, and it is gratifying to know that an association has been formed to take such steps as may be necessary to bring the trade to our woodworking factories.

Our export trade in furniture is likely to expand in the near future, the recent visit of British and Colonial agents for the purpose of establishing connections in this country being an evidence of the improved prospects. South Africa, as well as many European countries, import large quantities of furniture, and it is hoped that our furniture manufacturers, either through an association of their own or the Canadian Manufacturers' Association, will go after a greater share of this trade.

That branch of the woodworking business dependent upon the building trades has passed through a very quiet year, but here, too, betterment seems to be assured. Building returns during the last six months of the year reflected an improvement in many cities and towns, which we think augurs well for 1916. The vast amount of money which is coming to Canadian manufacturers for war material and supplies cannot but assist in bringing about a revival of building.

Compared with one year ago, Canada makes a remarkable showing. There is now confidence on all sides, where doubt and uncertainty existed twelve months ago. The marketing of the greatest wheat crop that Canada has known, and at prices away above the average of recent years, has put millions in money into the hands of the western farmers. Three hundred and fifty million dollars is the estimate of one authority as to the value of the wheat crop alone. Is it any wonder, therefore, that railway earnings are expanding rapidly, that bank clearings are showing an increase, that our war loan of $50,000,000 was over-subscribed by $60,000,000, that factories are busy, that labor is well employed, that business conditions generally have materially improved? The reason for this very favorable position is to be found in the fact that productivity is the keynote of Canada's wealth.

Various Types and Sizes of Shell Boxes

Brief Explanation of what the Specifications call for—Boxes must be well made—War Orders have benefited the Woodworking Industry

About two hundred woodworking and furniture factories in Canada are now engaged on shell box contracts. It has become an industry in itself, and it may reasonably be expected that large additional contracts will be placed from day to day to meet the requirements. The "Canadian Woodworker" has received numerous requests for information regarding the various kinds of shell boxes. This information we have endeavored to furnish in this number.

At the present time there are six kinds of shell boxes being manufactured, all somewhat similar, but each kind having its own peculiar features of construction and being for a certain definite purpose.

The 18-Pounder 6-Round Shell Box

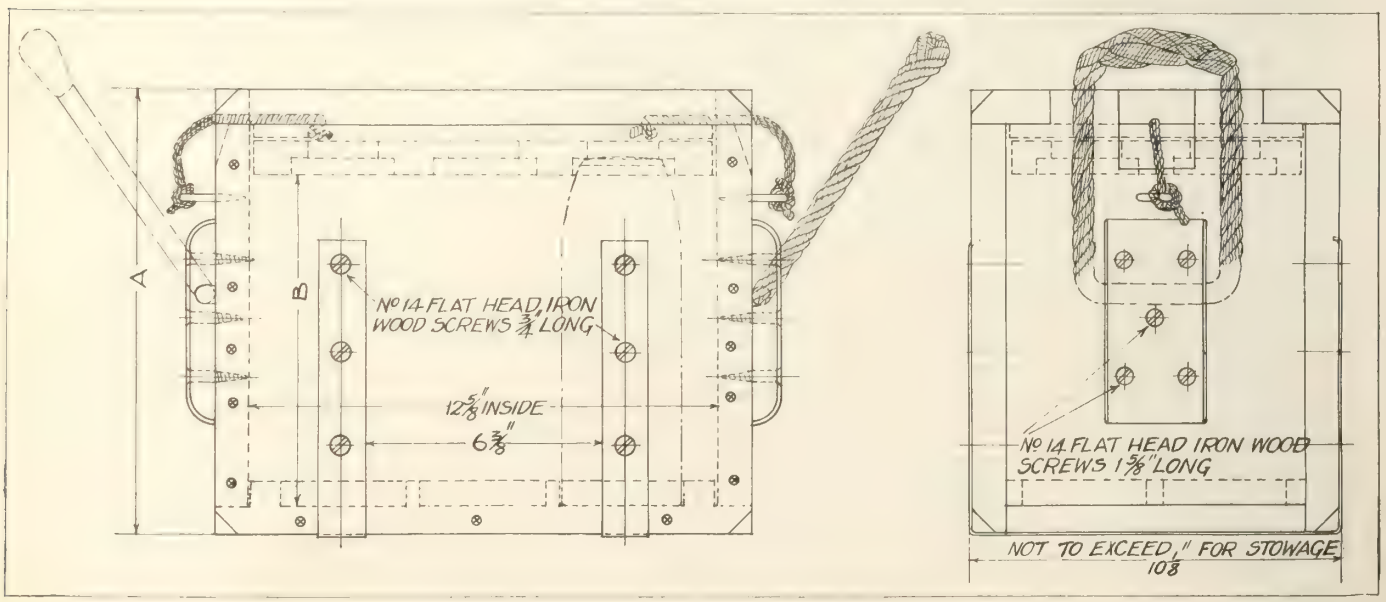
This box is used to carry the shells from the shell assembler to the arsenal. Its length of service depends upon its strength, as it is used over and over again as a carrier box. The body is made of 7/8-in. spruce and the ends and handle cleats of suitable hardwood. The lid and bottom may have one joint in each, which must be grooved, cross-tongued and glued. The sides, ends and bottom are well nailed together with 2½-in. wire nails.

The best grade lumber must be used in all boxes. It must be thoroughly seasoned, free from small splits, checks, sap, black or unsound knots. One end only may be allowed to be split, this split not to exceed six inches. No knot is to exceed two inches in diameter. By thoroughly seasoned is meant a seasoning or drying, either in the open air or in a kiln, or in both, uniformly throughout the entire sections of size delivered, the average percentage of moisture contained in the lumber when delivered not exceeding ten per cent. of its weight as determined by an actual experiment. The specifications call for "suitable hardwood" for the ends and cleats. Birch or maple are the woods that should be used. Some manufacturers, we understand, have interpreted "suitable" hardwood to include elm and other similar woods, but in this particular box they should not be used. The top of the end of the box is not supported except by a dovetail, and if certain woods are used they will warp when exposed to the atmosphere and consequently will not be passed by the inspector.

The inside dimensions of the box are 12⅝ x 8⅛ x 10 15/16 inches. The bottom has six recesses ⅝ inch deep and 3⅜ inches in diameter, spaced 3¾ inches from centre to centre each way. This can be obtained either by boring the holes out of the solid bottom 1⅜ in. thick or by inserting a tray. This tray, however, must be a perfect fit and well nailed down. It is of the utmost importance that the holes be of exact distance apart to prevent the copper driving bands of the shells from rubbing against each other. The shells are kept in place by a top tray which has ⅛ in. clearance all around the box. This top tray is made of ⅞ in. lumber with holes 2½ in. in diameter and has a countersink ⅛ in. deep on each side of the holes. On one side of the tray is secured a batten 5/16 in. thick. It is very important that the batten on the tray be of the accurate dimensions here given, for this reason: when carrying shrapnel the tray is placed in the box batten side down, but when carrying high explosives it is reversed, and if the batten is not the accurate 5/16 in., it will prevent the lid from fitting closely on the box.

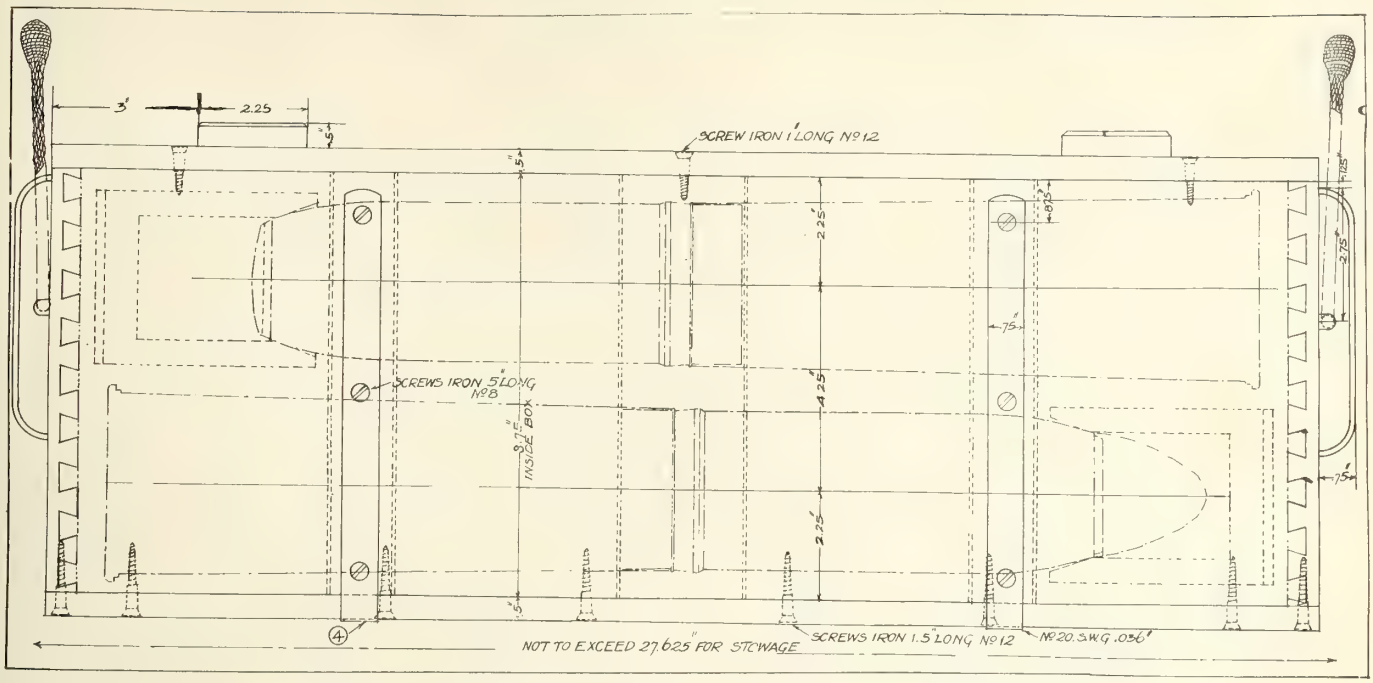
The sides and bottoms of the box are nailed and the cover screwed on. The sides are further secured to the bottom by two sheet iron bands held by iron screws. A handle is attached to each centre end by a cleat secured by iron screws. When filled with high explosives the box weighs 110 lbs., and with shrapnel 126 lbs.

Each box is to have the following stamped on it



18-Pounder 6-round Shell Box—Carrier Case.

Tray as shown in left drawing is used on the 15-pounder box. The holes for the tray for the 18-pounder are 2½ inches in diameter with a countersink ⅛ inch deep in each side of the hole, instead of having shoulder in middle of hole.



18-Pounder 4-Round Fixed Ammunition Box for Shrapnel or High Explosive.

in legible type, and all on the same end of the box:—

Contractor's initials or recognized trade mark.

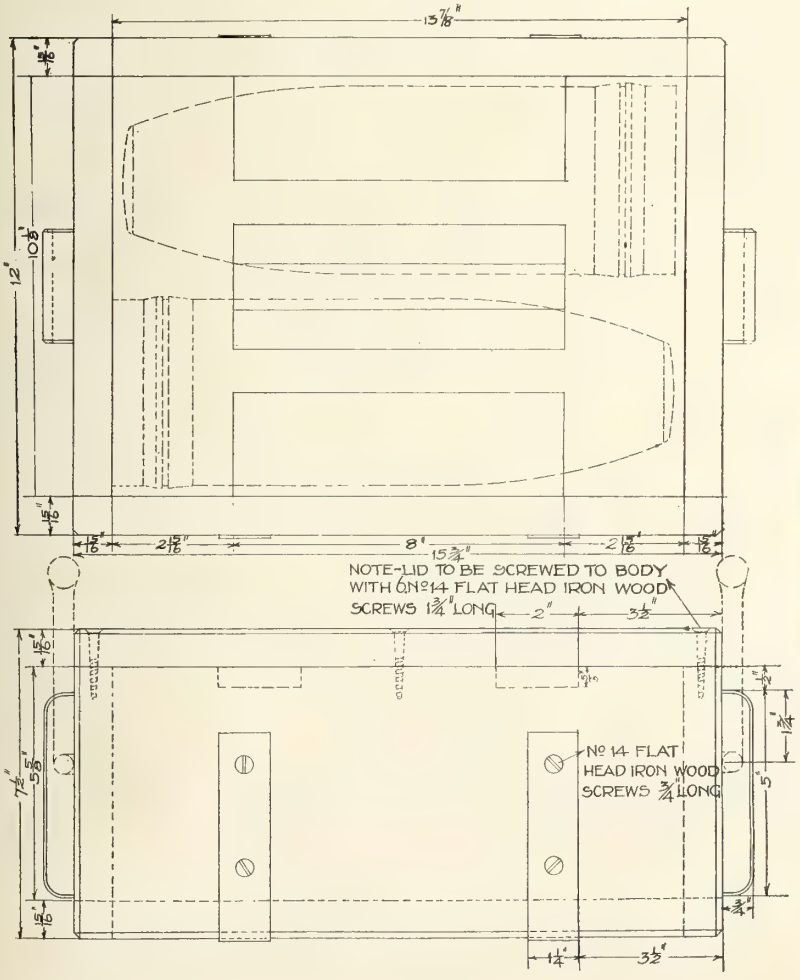
Year of Supply

Numeral

If on examination of 20 per cent. of any delivery, 20 per cent. of the boxes examined are found defective or incorrect, the whole delivery may be rejected without further examination. The inspector has the privilege of examining the lumber at any stage of manufacture, from the kiln to the finished box.

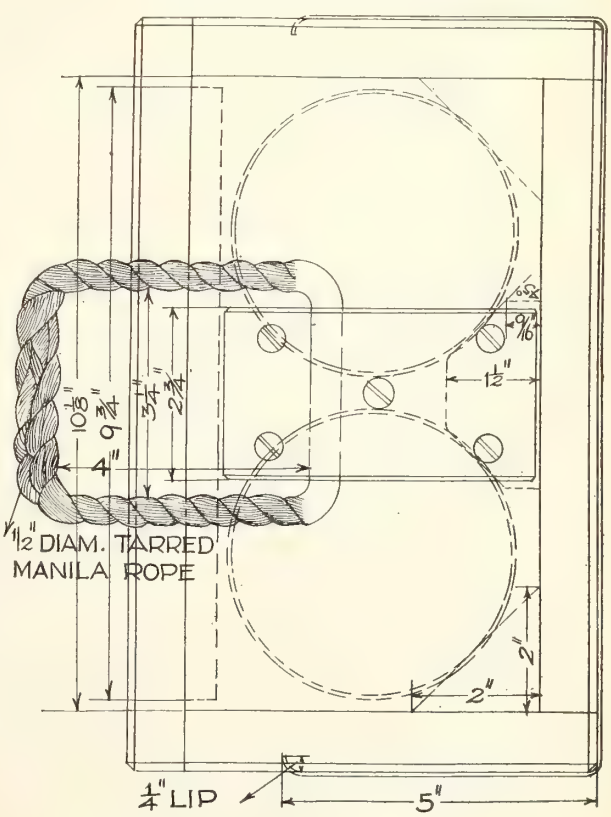
The 15-Pounder 6-Round Box

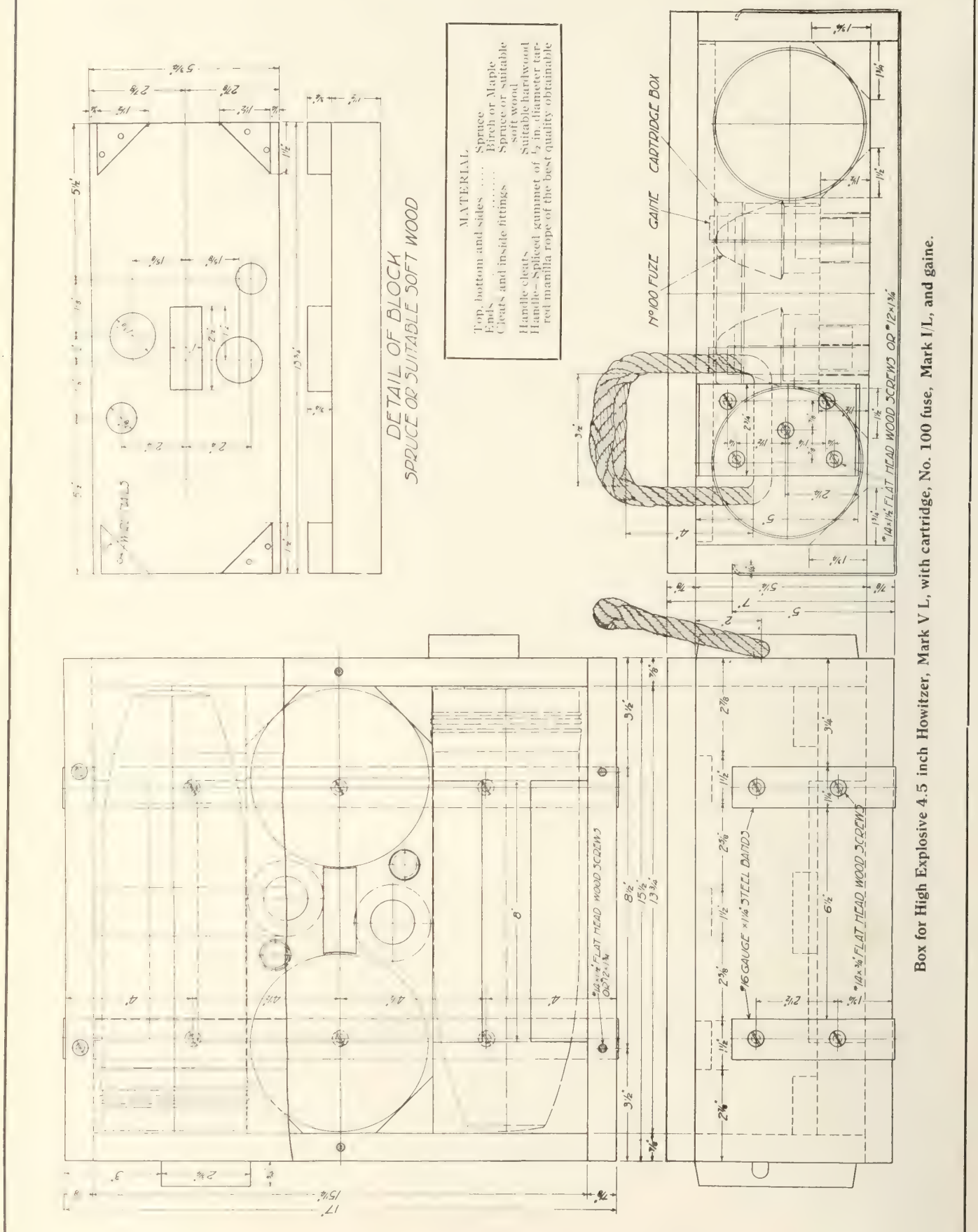
The details of this box are exactly the same as that of the 18-pounder 6-round, with the exception



Box for High Explosive 4.5 inch Howitzer Shells, Mark V—Carrier Case.

Plan and side elevation on left, and end view on right.





Box for High Explosive 4.5 inch Howitzer, Mark V L, with cartridge, No. 100 fuse, Mark I/L, and gaine.

that the 15-pounder box is a little shorter, the dimensions being as follows:

Description	15-Pounder Shrapnel
Height overall	11 5/8 in.
Height of Tray	8 9/16 in.
Diam. of Counterbore in Bottom	3 1/8 in.
Height of Cover Fit on End	9 15/16 in.
Height of Side	10 11/16 in.

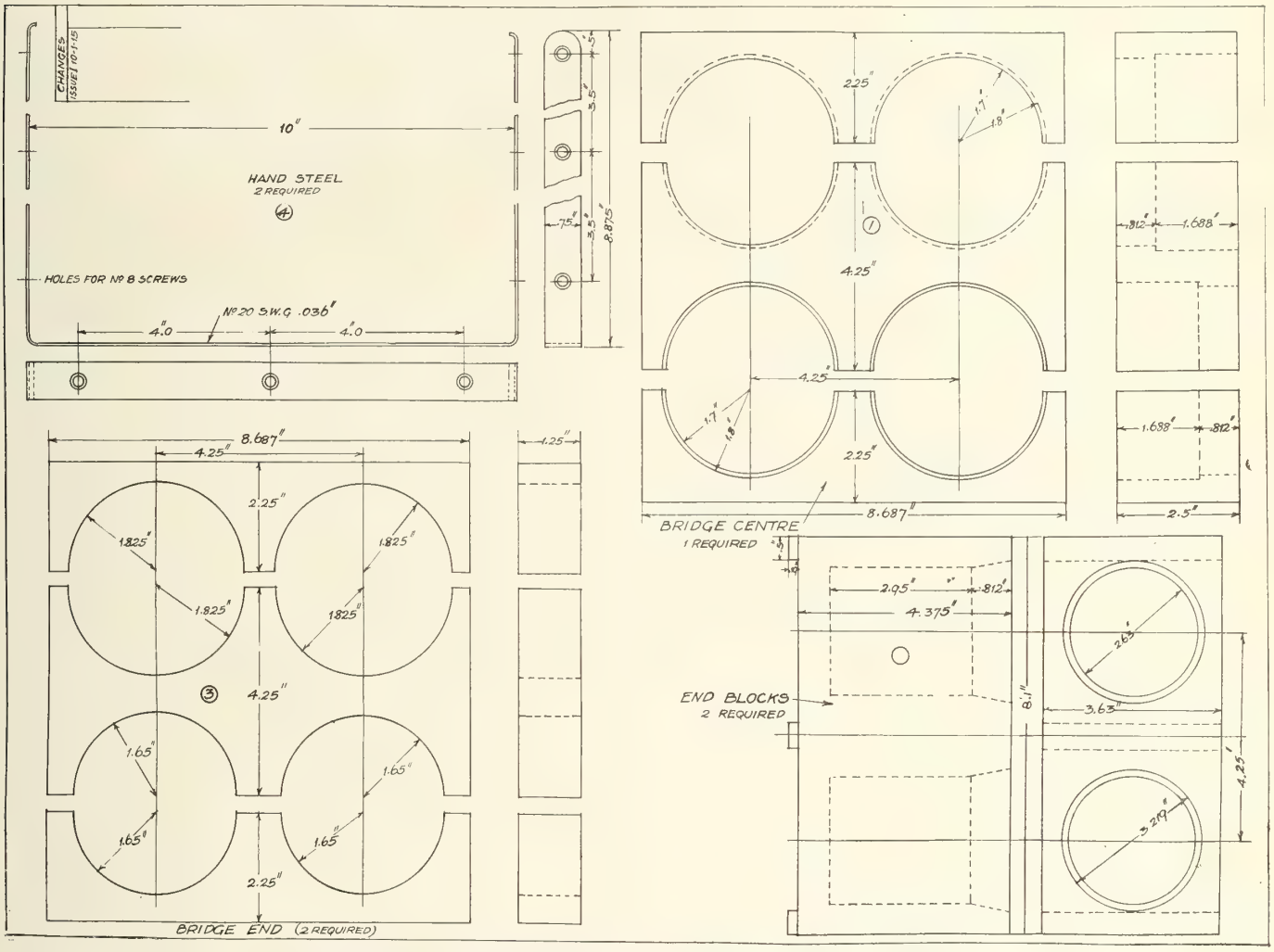
The 18-Pounder Fixed Ammunition Box

This is the box that carries the shells from the arsenal to the firing line. It carries four finished shells, either high explosive or shrapnel. The lumber specifications given above apply to this box. The outside of this box must be finished like a cabinet box, with the sides and ends dovetailed. The dovetailing on the box must be particularly well done, as the shells are wedged in the box by nose blocks, so that constant pressure is always maintained on the dovetailing.

The inside dimensions are: 24¾ ins. long; 8¾ ins. high; 8 1/5 ins. wide. The sides must be 9/10 ins. thick; the ends ⅝ in., the bottom ½ in., and the top ½ in.

The internal fittings consist of three sets of bridges, one near each end and one in the centre. Absolute accuracy must be attained in the manufacture of these bridges. The weight of the shells is carried on the two end bridges and the diameter of the four holes in the two end bridges are nearly the same as the diameter of the shells at both ends. The centre bridge must be larger than the size of the shells, as it protects the copper driving bands and acts as a safety device in preventing the shells springing too far. The accompanying illustration will give our readers the dimensions and construction of these bridges. The bridges are made in three parts, 8 11/16 in. long; the two end bridges of 1¼ in., and the centre of 2½ in. dressed stock.

Besides the bridges in the box are the nose blocks,



Bridges (End and Centre), Nose Blocks, and General Details of Band Iron.

which have two holes bored out to accommodate the fuses and noses of shells. The handles on the box are made of galvanized wire with hooked joints and are fastened with hardwood cleats. This style of box is screwed all the way through, and as in the other boxes, the sides are secured to the bottom by sheet iron bands.

The 4.5 High Explosive Box

The box for the high explosive 4.5 inch howitzer Mark V was formerly designated V/L. As with the 18-pounder, the body is made of spruce, except the ends and handle cleats. The lid is provided on the inside with battens of spruce, to be secured with 1¼ inch wire nails, also drilled with six countersunk holes

for screws, 1½ in. No. 14. The handles are made in the form of a spliced gummet of 1½ in. diameter tarred manilla rope of the best quality obtainable.

The 4.5 Fixed Ammunition Box

This box is made practically the same as the 4.5 box with the exception that it is a little wider, being 17 x 15½ inches. This extra width is to accommodate, besides the two shells, two wooden gains, two fuses and two cartridge boxes. Because of the width of this box the handles are staggered.

The 60-Pounder Box

The shell box for the 60-pounder, which carries two shells, is constructed exactly the same as the 4.5 Mark V, described above, with the exception that it is a much larger box. The inside dimensions of the 60-pounder box are: Length, 17¼ ins.; width, 11 ins., and height, 5¾ ins.

Specification to Govern Manufacture and Inspection of 18-Pounder High Explosive and Shrapnel Box

1. **General.**—The box must conform in all particulars with drawings Nos. C-62-B-63 and this specification. Should any discrepancy be found to exist between the drawings and specification, reference is to be made to the Canadian Inspection and Testing Laboratories.

2. (a) **Body.**—The body is to be made of white deal except the ends, which are to be made of birch or maple, the handle cleats of elm, beech, ash or oak. The lid and bottom may have one joint in each, which must be grooved, cross-tongued and glued. The sides and ends are to be dovetailed together and glued, the bottom being laid on overall and secured by iron screws. The sides are to be further secured to the bottom by steel bands secured by iron screws.

(b) **Lid.**—The lid is to be secured to the box by six screws as shown on the drawing.

(c) **Internal Fittings.**—The bridge pieces are to be made of beech, birch, maple or oak, and the blocks and fillets of white deal. The bridge pieces and blocks are to be accurately made to the requisite form for the reception of the stores.

(d) A handle is to be attached to each end of the box by a cleat, each cleat being secured by iron screws. Each handle is to be made of galvanized iron wire, the ends being hook-jointed and whipped with strong black waxed hemp thread, and bound with waxed cord to make a suitable hand grip.

3. **Stowage.**—The stowage dimensions of the boxes are not to exceed those given in the following tables:

	Width Inches	Depth Inches	Length Inches
18-Pounder	10.375	10.375	27.625

4. **Material and Workmanship.**—The materials are to be of the best quality, thoroughly sound and free from defects. The wood is to be well seasoned. Where boards are made in more than one piece, the joints are to be made to clear the screws, and no piece is to be less than 3 ins. in width. The glue is to be of the best "town made." The galvanizing is to be of the best quality and each wire is to be completely coated. The workmanship is to be good, and to the entire satisfaction of the Inspector. The boxes are to be delivered unpainted.

5. **Tests.**—The material used must conform to the tests laid down in the following test table, and to insure this specimens may, at the option of the Inspector, be selected from the various parts of the completed box. The contractor is to intimate to the Inspector when the material, both wood and metal, is ready for inspection, and no material is to be used that has not been approved by an inspector or an officer deputed by the Chief Inspector. In cases where material is being supplied by a sub-contractor, tests will be taken at the works of the latter only when the expense incurred is less than that of sending to the contractor's works, and then only when there is sufficient material to warrant the attendance of an examiner.

All parts or material damaged or destroyed by or during testing must be repaired or replaced, free of cost, by the contractor to the satisfaction of the Inspector.

TENSILE TEST

Material	Quotation No.	Minimum tensile strength per sq. in. or original area	Minimum elongation in a length of 2" and area .25" (1)
	I.C	Tons	Per cent
Steel forgings, general	10	28	30

Steel for thin plates of No. 12 S. W. G. and under, no elongation test will be taken unless specially ordered, but they will be tested by being bent double when cold, with a closed bend, without showing any sign of fracture and to be free from lamination, flaws, or other defects.

(1) Where only a test piece of an area less than .25 in. can be obtained from the material under test the acting length of the test piece will be reduced in direct proportion, the ratio of the acting length to the square root of the sectional area being as 4 is to 1. Pieces cut for test from material of less than .625 in. diameter or thickness are to be 8 ins. long overall, From material of greater diameter or thickness a length of 5 ins. will suffice.

The boxes will be tested by a strain applied to the handles equal to a dead weight of 364 lbs. and must be capable of standing this test without showing any defect.

The galvanizing of the handles will be tested by immersing a sample of the galvanized wire in a saturated solution of sulphate of copper at 50 degs. Fahr. for a period of one minute; it will then be washed in clean water, and wiped with a clean rag. The galvanizing must admit of this process being performed three times with each sample, without showing any sign of a deposit of metallic copper on the wire.

6. **Marking.**—Each box is to have the contractor's initials or recognized trade mark, and the numeral (11), and the year of supply, stamped on it, in legible type. It is also to be stamped with numbers, etc., from 1 to 1000, then A.1 to A.1000, then B.1 to B.1000, etc., in ½-in. figures on the end of both the lid and the box. All stamping is to be done on the same end of the box.

The Turn of the Tide

Canadian bank clearings for October aggregated $785,814,909, the biggest showing since December, 1913.

Essentials of the Box Factory Double Surfacer

H. Van Earl

Put the matter of a surfacer up to any box factory operator and the one thing he will say is to get a machine as essentially different as possible from the machines in use a few years back. Until recently box factories were quickly and cheaply constructed buildings. For the most part they followed the mill, and so were more or less temporary in character—when the lumber of the locality was exhausted the box factory was moved on. This naturally resulted in the building of temporary structures, which, of course, were outcasts among fire risks. The companies wrote small lines at high rates and most unwillingly. Under these conditions cheap machines were used, in fact the woodworking machine manufacturers only went so far as to supply the demand, so that the progress of efficiency in box factory equipment has been very tardy.

National advertising has now changed much of this. The demand for box factory products has become standardized, contracts are made for the year, a steady stream of similar orders goes through the machines, so that better methods and better organization have had to follow in order to systematize the business. This improvement normally reflects in the supply of better equipment.

To appreciate the extent of this change, let us consider some of the drawbacks of the old. It used to be that your double surfacer was a machine with small feed rolls—about 5 in. or 6 in. in diameter, and never sectional. The chip breaker was either divided or solid. The use of thick knives and a complication of gears absolutely prevented a speed of over a quarter that of the modern tools. The limitations of these "traps" were doubled during the winter season. For when the boards were covered with snow and ice there was great difficulty in getting the small rolls to feed. Instead of climbing the ice they would imbed themselves in it and slip rather than carry through the lumber. Then again, the friction was too great, as the under head was in the back of the machine away from the top one, which necessitated a longer machine.

Some makers tried to get around the early troubles by the use of the endless travelling lag bed. This was quite successful as far as taking care of the feeding part was concerned. But when it came to smoother planing and greater capacity there was still much to be desired. Knots, ice or bark would get under the lags and break them, and usually this meant broken cutter heads and knives. Then, after the first half year, the lags would become worn so that one or two would have to be replaced, and this meant that the new lag would project higher than the rest, with the result that the bed would be uneven, which would show up in badly marked lumber. A great deal of lumber also had to be replaned because the machines were not built with enough pressure to take the warp out of the lumber, so that the high place in the centre and the two high edges on the opposite side would be all that was planed. Then the solid chip breaker was not able to hold down a thin board if a thick one were being planed beside it. This resulted in the thin stock all jumping under the knives and being absolutely ruined.

The correct makes of modern machines have features that eliminate all of these old drawbacks. In the first place, they are all built short, with heads set nearly above one another, so as to allow all the feed works and pressure to come in contact with the lumber while being planed, instead of spreading over the whole length of the board. Sectional twelve-inch rolls are supplied, heavily fluted, in order to break up the ice, as their size permits climbing, it thus making the most powerful feed obtainable. In connection with this is the sectional chip breaker, which allows the haphazard feeding of random thicknesses across the full bed with as even pressure assured to all.

The use of small gears with but one or two teeth meshing has also been eliminated through 12-in. sprockets with roller bearing chains. With the chain and sprocket drive a grip is obtained half way around the sprocket, while the chain allows a speed of feed as fast as the operator can handle stock. The wear on the drive mechanism, moreover, is greatly reduced, as working at the old speed the twelve-inch rolls give four times the old feed.

These machines are built so heavy that warped lumber is held down so as to be planed as it should be, and owing to the close coupling, stock lengths of but a few inches can be fed one back of the other without danger of breaking lags or injury to the machine in other ways.

Following the use of the latest improved round heads and thin knives with automatic jointer and grinder attached, the grade of stock is raised at least 25 per cent. even though the speed of feed has been increased as much as 150 feet over that of the old methods.

Rather than throw out their old equipment some men have asked whether they could not adapt the round heads to their old tools. They could, but no benefit would result, it would be like installing a racing magneto on an auto, and expect the old engine to develop more power.

The round head is a wonderful success and is here to stay, but like anything else it will not do good work under abuse. It is a good deal like the band saw. After that gets dull it is not run until it has to be shut down. Every day at the same time it is shifted and properly cared for, so as to keep up the quality of lumber and to avoid cracks in the blade, which would require double the time to get it in shape again. The same applies to the modern cutters, only more so, as being used for a finishing operation that determines the price of the product the cutters should receive even more attention. The chief reason for neglect has been that the saw blade has to be taken care of or it will not run at all, while the knives will run under abuse, so that their grinding and trueing is not done as often as the best results demand. Nothing is saved and everything is lost by such treatment. The lumber suffers in quality, the speed is lessened, as is output; cutters do not last as long, and the entire machine goes to pieces quicker, as the duller the knives the harder the pounding on the journals and bearings. So that instead of condemning modern methods, understand them and apply your knowledge, then you will be able to greatly increase the capacity and quality of your factory, while proportionately cutting down the expense.

Efficiency in the Making of Shell Boxes

Account of the Methods Employed by Henry Morgan & Company—System and Labor-Saving Machines Result in Producing both Quantity and Quality

In order to meet the urgent call for shell boxes to keep up with the rapid production of the ammunitions of war, Henry Morgan & Company, Limited, Montreal, have turned over a large part of their Beaver Hall factories, and their splendid equipment of machinery, to the making of these shell boxes. Two or three additional machines were required, and after these were installed, their factory was made fully equipped for turning out large quantities of these boxes.

There are naturally difficulties confronting their manufacture, due in part to the strict specifications, scarcity of the kind of lumber, also to technical points which require elucidation.

Henry Morgan & Company—Dovetailing the Boxes.

The boxes made in the factory of Henry Morgan & Company are for high explosives and shrapnel, and will hold four-fused rounds or four-blocked rounds with fuses. Both the sides and the top and bottom are manufactured from spruce, the ends from birch or maple, and the handle cleats from elm, birch, ash or oak. The pieces for the bridge are made from beech, birch, maple or oak, while the blocks are of pine. The inside dimensions of the box are: Width, 8⅛ in.; depth, 8¾ in.; length 23¾ in.

The construction of the box inside comprises three bridges for holding the shells, each bridge being made up of three pieces. The end bridges are 1¼ in. thick and 2¼, 4¼, and 2¼ in. deep; the centre bridge is 2½ in. thick and 2¼ in., 4¼ in., and 2¼ in. deep.

The top and bottom pieces of the bridges are each bored in the form of two half circles, while the centre is four half circles, two on each end. The interior fittings of the box when put together thus form four circles or a total of twelve circles, when the three bridges are placed in position in the box. The design of the interior of these boxes is for safety and compactness in handling. The shells are packed in two layers of two each.

In packing the filled shells, the pieces of the bridge are fixed in the box, the shells are laid in the half circles, and the centre pieces, when placed in position, form six complete circles (in which two shells rest), and this also forms a section of the upper six circles. The two other shells are placed in 6 half circles, and the top pieces put in, making the other 6 complete circles.

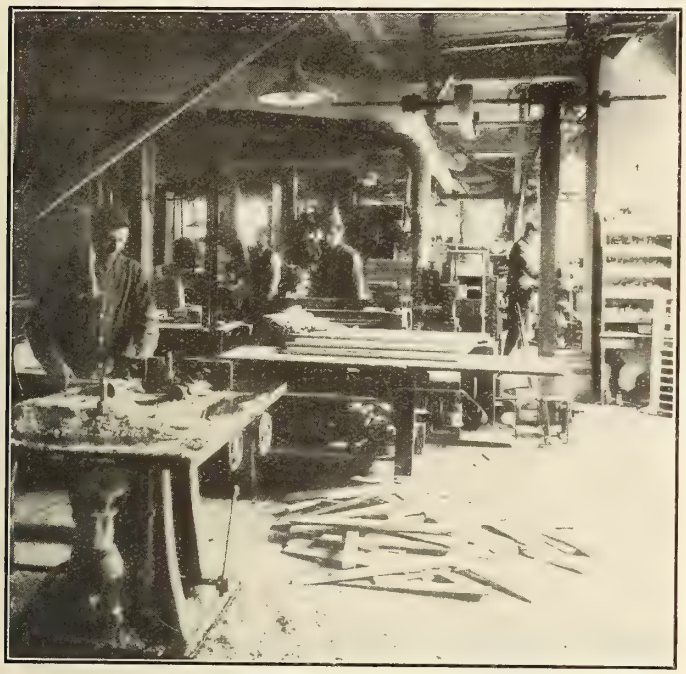
Henry Morgan & Company—Boring the Bridges.

Pine blocks, with a space bored for the nose of the shell, are inserted in each end, the whole constituting rigid internal fittings which prevent the shells from moving. Any possible movement of the shells is further guarded against by a rim made in boring the bridge circles.

Skilled work of the highest order is required in the making of these boxes, and so numerous are the fittings that one thousand boxes consume about thirty-five thousand feet of lumber.

The lumber is purchased in car loads and shipped to the factory as required. It is unloaded on the ground floor and that required for the sides, ends, tops and bottoms

is transferred on rails to the kiln. After being dried, the lumber not immediately required is stacked; the lumber required at once goes to a rip band saw, with a resaw attachment, made by the American Woodworking Machinery Co. A portion of the lumber is dressed on the four sides by a



Henry Morgan & Company—Marking the Cleats and Handles.

McGregor-Gourlay machine. A circular ripsaw and a swing saw cut the wood into required sizes for handling in the conveyor, which takes the lumber to an upper floor, where the boxes are made. This lumber is then fed into a Berlin sticker machine which dresses the lumber on four sides. This is a very powerful machine and very rapid in its work. The planed lumber then passes to an American double saw, where the covers, sides, ends, bottoms, and also the pine blocks are cut. The lumber for the bridges after leaving the sticker goes to a Berlin self-feeder cross-cut saw. The sides and ends are afterwards conveyed to two dovetailing machines, one made by Jackson, Cochrane & Company, of Berlin, Ont., and the other by A. Dodds, Grand Rapids, Mich.

The sides and ends of these shell boxes are dealt with in one operation. From the dovetailers the parts are sent to the benches, where the sides and ends are put together, glued and clamped in a machine made by the Orange Turbine Mfg. Company, of Orange, Mass. The next operation is that of tacking on the bottom, after which the box, now taking shape as a complete product, is sanded on the disc sander which smooths any roughness off the sides and ends. After the box has passed on to a borer, made by the American Woodworking Machine Company, eighteen screws are put in by an automatic machine, manufactured by the Reynolds Pattern & Machine Company, Moline, Ill. To give further strength to the box for the great weight of its contents, and to withstand rough handling, the sides are further secured to the bottom by steel pins ¾ in. wide. The screws, nine in number, in this operation, are put in by hand. The boxes are then transferred to the next table, and handles are put on at each end, the cleats being fastened to the box by five screws. The handles are of galvanized iron wire, with the ends hook jointed and whipped with strong black waxed hemp thread and bound with wax cord to make a good hand grip.

After the boxes have been assembled and the bridges fitted, the boxes are passed on to the Government Inspector, who stamps them. The box is now complete and is sent down a chute to the ground floor and is at once loaded on a waiting truck and dispatched.

The various parts of the box are moved from machine to machine, in their process of being made, by Canadian Fairbanks-Morse trucks, and transfer trucks supplied by the Chapman Double Ball Bearing Company, of Toronto. The saws are made by Simonds Canada Saw Company, Montreal.

The entire plant is electrically driven, current being supplied by the Montreal Light, Heat & Power Co.

The installation of labor-saving machines, the arrangement of the entire factory, so that lumber comes in at one end in the unfinished state and goes down a chute at the other in the form of a finished box, right on to the waiting truck, has made possible a tremendous production of boxes without confusion and with the least possible handling of material.

The Beaver Hall factories of Henry Morgan & Company, Limited, are a splendid instance of efficiency in machine shop arrangement and management.

Henry Morgan & Company—Shell Box Assembly Department.

Practical Comments on Shell Box Making

By "Superintendent"

When the Shell Committee commenced to give orders for ammunition it became evident that the box-making industry would also share in the business under the control of the Committee. The usual packing case for commercial purposes was unsuitable for packing shells, and special specifications were prepared for the required boxes. The ordinary box-making firms, of course, received orders, and in addition orders were placed with many factories which up to then had been making furniture. When these were placed there naturally arose the question as to how many boxes would be required, and how long the orders would continue. Orders running from 10,000 to 25,000 were about all anybody could obtain, and for a time many manufacturers could not see their way to spend much on equipment. It was not long, however, before it was clear that orders were to be limited only by the capacity for output. The problem eventually became one of equipment, and to make all the operations as nearly automatic as possible.

Not the least of the difficulties encountered in making shell boxes is the securing of a steady and sufficient supply of lumber of the right dimensions and properly dried. The Government inspection calls for not more than 10 per cent. reduction in weight upon test. Birch 3 in. and 1½ in. thick is used in the construction of the bridges. This is almost impossible to dry except in a very slow kiln and at considerable expense.

Many manufacturers are buying up all the 1914-1915 cut lumber in sight, so that there is now very little but 1915 cut to be bought. Not only is dry lumber necessary in view of the Government test, but it helps considerably in the process of manufacturing. Most firms are dressing all the lumber for boxes on one or other of the fast feed moulders or matchers at speeds from 100 to 250 feet per minute. Given suitable space and good sawing and moulding facilities there is nothing about this part of the work that presents any problems.

The Shell Committee are accepting many varieties of dovetail; some makers are using the regular box dovetail showing through ends and sides; others the regular furniture dovetail similar to that used in drawer work. This has the advantage of only requiring to be cleaned off on the one face instead of two, and leaves the ends clear for the stamping of numbers and identification marks. The grooving of sides involves no difficulty if it is properly handled; in some shops the regular dado head is used, making three or four operations, besides squaring to size. The only really satisfactory way is to have a mandrill carrying five heads of suitable size, and two saws cutting off the stock and grooving at the same operation. It takes quite a little power to drive this machine, and the heads need to be of first class quality and workmanship; only in this way can the necessary accuracy and output, so important in every operation, be obtained.

Top and bottom only call for accurate planing, jointing and sawing. There are various machines for boring the necessary holes for screws, but the operation is simple and presents no difficulties if rightly handled. It is when one starts on the bridge work that the real difficulties crop up. Very nearly every machine factory has brought out a machine to take care, more or less, of these bridges. The pine block to take the ends of shells is the least difficult to handle. It can be bored with either centre or auger bits with suitable countersinking attachment. A simple double spindle boring machine can be made to bore both holes at once. The greatest trouble is to get dry lumber suitable for the blocks 5 in. x 5 in. x 4 in. If the war lasts another six months manufacturers will be gluing up stock for this block.

The end bridges are made of three pieces of birch, together measuring 8¾ in. x 8⅝ in. x 1¼ in., and having four holes of two separate diameters. On a single spindle borer, they must be clamped together in a box and two holes bored, then the bit changed or the box passed to another machine for the other two holes. In the single spindle machine the important thing is to get all holes exactly true to centre. A deviation of 1/16 of an inch may mean the rejection of some of the bridges and refilling some boxes.

The machine for boring two holes at a time decreases the possibility of mistakes, but it only increases output about 70 per cent. The reason for this is that the amount of shaving thrown off by the centre or auger tends to clog the bits and to require more cleaning from the clamps before it is ready to receive the next set of blocks. Barrel saws have been used for the work; they make less shavings but are not so fast in cutting nor so clean working at the finish of the cut.

To bore four holes at once is no doubt ideal from the standpoint of necessary accuracy, but it presents many difficulties that have not yet been overcome. Owing to the closeness of the holes, 4¼ in. centre to centre each way, the heads must be driven by gears very close together, consequently small and subject to a great deal of wear and strain, especially when the table is automatically fed. The strain on the stock when the cut is nearly through causes the short grain to break off and then one must look out for trouble. If barrel bits are used in this type of machine there is still the problem of the centre block of waste and the danger of its clogging the bits.

Some manufacturers are band sawing these bridges, but no matter how good a sawyer you employ there will be a considerable percentage of rejects because the holes are not absolutely to size. The centre bridges made from 3-in. stock, with its counter-bored hole, can be handled on a machine boring one or two holes at a time. Both centre auger and solid bits are doing this work with more or less satisfactory results. Certain manufacturers are bandsawing and then finishing with bits, operating something like a shaper cutter. The only difficulty about this method is how to get all holes exactly in the true position; to do this it is necessary to have a very accurate set of boxes and cramping devices to hold the stock. While this entails two operations in the one block, both are so much quicker that the two together do not consume much, if any, more time than boring.

The assembling and inspection are the final operations on the boxes, and the cost of these depends a good deal upon the results obtained on the machines. If the boxes are all exactly the same size and glued up to exactly the same width, and all the bridges work to standard size, the boxes will assemble with very little trouble, but the "ifs" and "buts" are the crux of the whole thing.

There are nineteen pieces of lumber to make one

of these boxes; there are 16 large holes to bore (not counting screw holes) altogether, by the quickest, most direct method, 35 operations on the same pieces of lumber, not counting ripping and dressing—making about 75 chances to one against every box being perfect.

The principal difficulties that will develop in the assembling arise from:

1st. Carelessness in putting in screws, in handles and bands.

2nd. The bridges do not fit the grooves, caused by bad gaining or more likely by the block being sawn incorrectly, or the boxes not being properly glued up.

3rd, and most frequent, by the holes in the three bridges not being in perfect alignment.

Ultimately shell box making is just as easy as any other process of manufacture if you have the right tools and men, and pay the same price as you will have to pay for any other successful operation.

Letters to the Editor

Ammunition Box Contracts

Orillia, Ont., Nov. 12, 1915.

Editor Canadian Woodworker:

Dear Sir,—We have just completed a batch of 25,000 ammunition boxes for 4.5 shells, and found splendid satisfaction in making these boxes. While the price is rather low on them, still, at this particular time, when the furniture business is quiet, we are glad indeed to have anything extra to keep our staff and organization together.

This particular box seems to be extremely well designed for use and abuse as well, as the specifications restrict the use of lumber to such as will stand very rough usage. This would indicate that it is good business to buy lumber of a fairly good grade; in fact, we found it advisable to use a better grade than was absolutely necessary, as it required less labor to work it, and we had a smaller percentage of waste.

We are well equipped for making these boxes, so we did not buy one dollar's worth of special machinery, only a few drills for our boring machines. We made a number of forms and patterns which were necessary to insure the proper measurements and interior fittings in the box, and as a result we have had no trouble whatever with the Inspectors.

We purchased our supplies of lumber, screws, handles, bands and nails, giving instructions for weekly shipments to complete our weekly output of boxes. If we get another order we will have all our supplies shipped in and store them here, as this is the only real problem we had to contend with.

Aside from manufacturing these boxes. We have heard some criticism regarding the manner in which the orders have been allotted, and we would like to say a few words on this subject as well.

Some complain that the orders have not been distributed among enough factories. To do this would mean a smaller order for each factory, and, of course, a higher price, which would be very poor business, as Canada could turn out one hundred boxes for every shell, and the Committee could therefore get lower prices for larger orders, and not restrict the output, as might be the case with shells.

Further, we have heard all kinds of stories about orders for boxes being given to people without a factory, and then farmed out. If a party solicits and receives an order for boxes he can only do so on the strength of his statements to the Shell Committee, and if he misrepresents himself to them how can they dispute him?

While the Shell Committee are doing their best to supply shells, and help the cause we all have at heart, we believe there might be such scoundrels in Canada as would attempt to secure orders by misrepresentation. In every case where we heard such stories we asked for the names, but the story-tellers could not supply any names or particulars, so we think possibly the originators of such yarns are more selfish and less patriotic than the members of the Shell Committee, who have taken an extremely heavy share in looking after the output of three hundred factories, and deserve praise instead of censure. Very few of us look after our own interests as well as they look after their business of supplying ammunition to the soldiers.

Yours truly,
The Orillia Furniture Company, Ltd.

Belt on Flat Pulleys—Swaged Saw Teeth

Revelstoke, B.C., Dec. 1st, 1915.

Editor Canadian Woodworker:

Sir,—In the November Question Box is a query as to why a band saw stays on flat wheels, while a belt running on flat pulleys would be an absolute failure. The answer gives tension in the saw as the reason. In my opinion this is scarcely sufficient, as a band saw will stay on the wheels with no tension, but it would not cut lumber, that is, if it were over three or four inches wide. Why should a belt running on flat pulleys be a failure? I have been running them that way all my life, and have had no trouble, only where shafts have been out of parallel, and a crowned pulley would not make a belt run true in such a case. However, a belt could be crowded off the pulleys where a band saw could not, for this reason, a saw blade six inches or so wide is rigid, but a six-inch belt is not, nor a ten-inch, for that matter. Lay a length of each flat on the floor and try how far they can be deflected from a straight line; the belt will be easy, the band blade will not.

Another correspondent enquires about the merits of swaged teeth for small circular saws. I quite agree that the swaged tooth is best for both band and circular saws used in straight ripping, but it certainly requires more power—I have definitely proved that to my own satisfaction. Some time ago I fitted up a new 20-in. saw with swaged teeth and tried it on a small saw bench, the arbor pulley being about four inches by four and a half face; it would not rip four-inch plank without throwing the belt. I hammered out the swage spring, set the teeth and beveled their backs slightly; we then ripped 8 in. x 8 in. Of course, a 20-in. saw is too large for such a small pulley, but it proves my contention.

Yours very truly,
F. W. Wiffin.

Increased Exports

Canada's exports are now running at the rate of $600,000,000 a year. This is one of the reasons why general business conditions have been showing improvement for some months past.

Modern Methods of a Western Box Factory

An outline of up-to-date practise and systematic business principles which have brought excellent results for the Czerwinski Box Company, Limited, of Winnipeg—Large contracts for manufacturing Shell Boxes for Dominion Government—Cost system is special feature

Mr. C. F. Czerwinski.

Historical

Fifteen years ago this firm first started business in Western Canada — then practically a new field for the woodworking and box-making industries. The firm was then styled Czerwinski & Grant, and their first factory was located at 140 Lombard Street—now the centre of the wholesale district of Winnipeg. The factory, which was of frame construction, measured 26 feet wide by 40 feet long, and the equipment cost about $1,000. Czerwinski & Grant remained in these premises for only a year, when they removed to more commodious buildings at 95 Lombard Street. Here they trebled their equipment. An important happening during the life of the firm at this location was the fact that it was changed from a private company to a joint stock company bearing the name of Czerwinski Box Company, Limited. Mr. Czerwinski assumed the presidency of the company in 1904 and Mr. Grant sold out his interests in the firm to the new president.

In 1905 Mr. Czerwinski thought it would be advisable to erect an up-to-date factory to look after the growing business of the firm. With this in view he erected the present buildings at the corner of Logan Avenue and Tecumseh Street. So well has the firm progressed since they took this important step that it is now said to be the leading box factory in Western Canada. (See illustration No. 1).

In 1900 there was a serious slump in business throughout Western Canada consequent upon a crop failure affecting every line of business. In spite of this slump the firm did a fair business, and since that time never looked back until 1907, when the money panic in the United States again affected Canadian trade. However, by sound business principles the firm tided this year successfully in spite of the scarcity of business, and, thereafter, their trade steadily increased until 1913, when the present decline in business in the West made itself apparent in the woodworking industry in Winnipeg. Business remained fairly quiet until this year, when war orders were secured. It is of interest to note that during 1912 business was so brisk that the firm was obliged to add an additional storey to the factory. Up to 1907 the firm limited its operations to the manufacture of boxes, but after that year all kinds of inside finish was manufactured, such as furniture, telephone booths, phonograph record cases, office furniture, and drug store, bank and office fixtures.

A Modern Factory

The present factory is of solid brick construction with a solid stone foundation, two storeys and basement high. The building, however, is designed to carry an additional three storeys whenever required. The factory is of substantial semi-mill construction, all exposed windows and doors being fireproof. The building is steam heated, and is lighted by electricity generated by a dynamo located in the power house adjacent to the building. The building is also equipped with a most up-to-date shavings exhaust system.

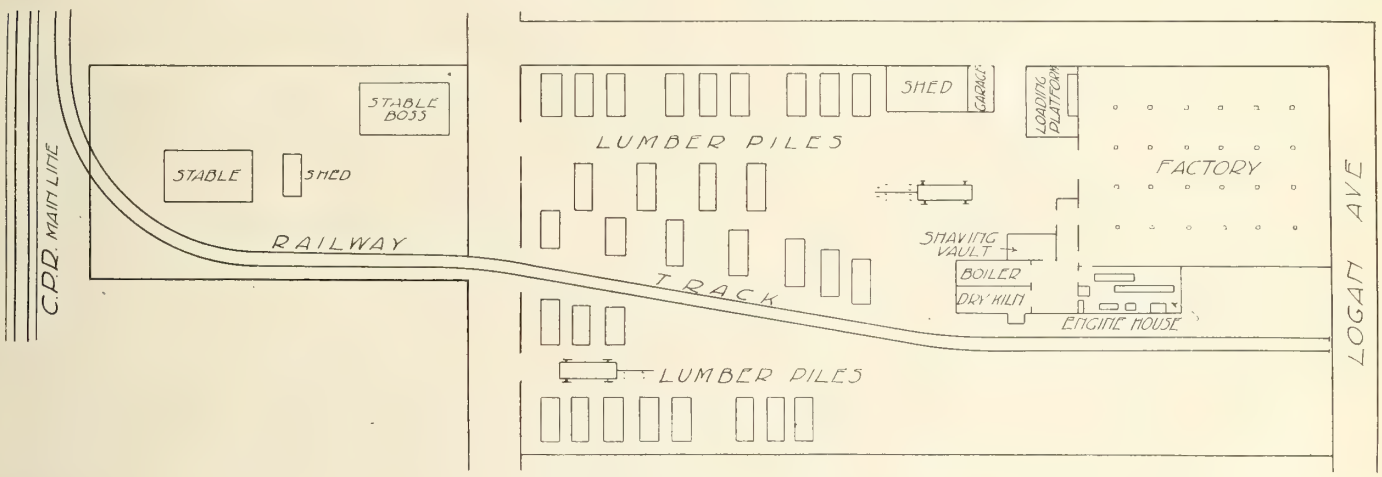
The yards, siding and factory cover a large area, as may be seen by referring to the plan of the layout of the site, Fig. 2. It will be noted that a siding is run

Present Factory of the Czerwinski Box Company, corner of Logan Ave. and Tecumseh St., Winnipeg.

in from the main line of the Canadian Pacific Railway right into the yard of the firm. The plant is laid out for the economical manufacture of all kinds of wood products. The average force employed is about one hundred men. The factory is specially well equipped for fire fighting purposes. Throughout the building there are four fire extinguishers on each floor. An additional feature—one often overlooked by woodworking concerns—is the important addition of two baths of sand and water on each floor. In the basement and on the first floor there are two 50-feet lines of hose with two different branches, while on the second floor there are also two water supply systems, including a 50-foot extension, the hose throughout being laid on iron sockets ready for instantaneous use. The factory is swept clean of sawdust and rubbish every twenty-four hours in order to minimize the risk of fire. The sanitary arrangements are superb and reflect great credit on the manner in which the factory has been laid out for the health of the workers. All lavatories have the latest conveniences. The building is well lighted on all four sides by large windows with unobstructed views.

Equipment on Main Floor

In describing the various features of the building we necessarily make mention of many types of machines used. In this connection it is worthy of note that the factory is equipped with machinery which cost over $75,000.



Czerwinski Box Company—Layout of site.

The first floor, illustration No. 3, contains motor rooms, power transmission lines, and the exhaust system. All the motors, exhaust fans, and engines are erected on solid concrete bases, just as are all heavy planing and resaw machines. There are two motors, each 50 h.p., for supplying power for an exhaust system which blows the dust throughout the factory into the boiler. In a box factory this is a very important feature.

The equipment on this floor includes a Lockcorner machine supplied by the Morgan Machine Company. This is used to lockcorner butter boxes, which are made principally on the first floor, which is the basement of the building. However, other types of boxes can equally well be lockcornered by this machine.

How Butter Boxes Are Made

In order to make a description of the first floor more interesting to our readers let us show them how butter boxes are manufactured. First of all, the lumber is cut into the required lengths by the cut-off and rip saws. These lengths then go to the matching machine, where they are matched and glued, after which the box is lockcornered by the lockcorner machine. From here it proceeds to the glue box; thence to the squeezing machine which puts the box together. It is now necessary to trim the corners of the box. This is done by a short trimmer machine supplied by the McGregor, Gourlay Company, of Galt, Ont. (now the Canada Machinery Corporation). The box now proceeds to the jointer and from there to the nailing machine, which nails the box together. The last process of all is that designated to the drum sander, where the exterior of the box is trimmed up to a smooth finish. Two machines are used to nail the top and bottom of the box together. The Morgan Machine Company supplied all the nailing machines used in this factory. The butter boxes have to go through a further treatment than other boxes, owing to the fact that the butter must be preserved whilst being shipped to its destination. For this reason all butter boxes go to a special paraffine wax tank, where the interior of the boxes receive a coat of wax, which preserves the butter. The butter box is now complete, but is not yet ready for the consumer. The box is now taken to a dado machine made by the firm, where a hook top is made in the box. In the dado machine there is a special small saw for making this particular attachment. Before the sides are put together they are taken to a printing machine which prints all boxes turned out by the Czerwinski Company before the box is taken to the different machines. The printing machine is a two-color Morgan box printer.

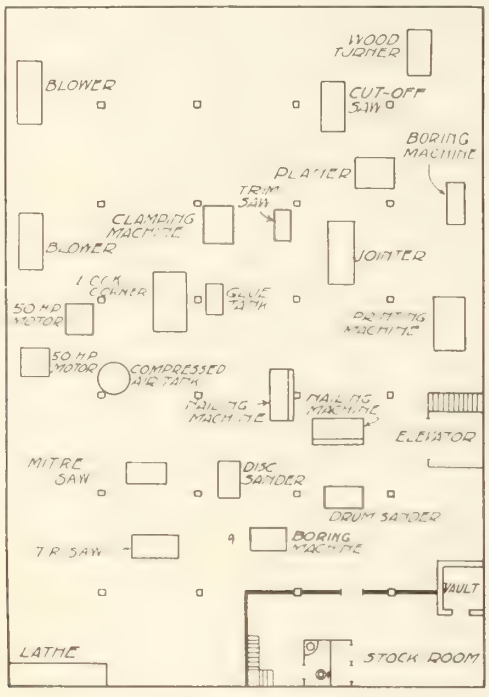
On the first floor also is situated an air system carrying 200 pounds pressure with branches on all floors. This system cleans all the machines of sawdust. Minute particles of sawdust get lodged in such positions in these sawing machines that it is impossible to clean them in the ordinary method; hence the necessity of the air system. There is also a special six-bore machine, principally used for boring mineral water boxes. An automatic 5 h.p. motor elevator connects all floors.

Second Floor Equipment

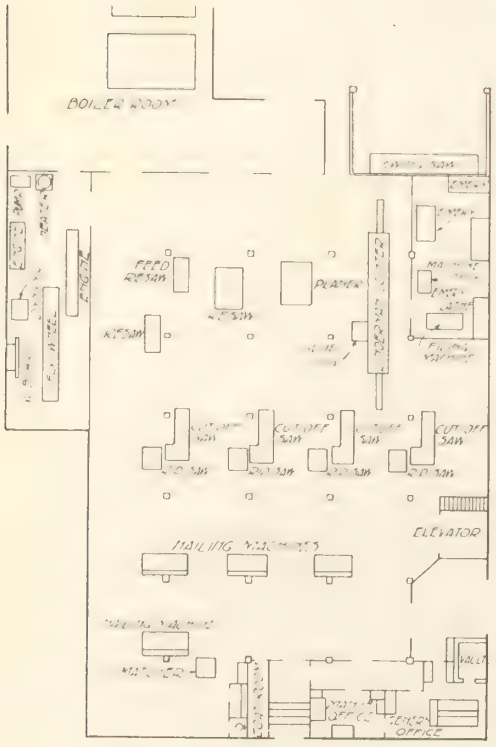
The plan of the second floor is shown in illustration No. 4. The space on this floor is extremely economically used. The first object which one notices on entering this room is a time clock with fifty checks. All kinds of boxes are made on this floor. At the present time large quantities of ammunition boxes are

being rushed out by the Czerwinski Company for the Dominion Government.

The lumber selected for the manufacture of shell boxes for the Dominion Government, after coming from the dry kiln, is first of all taken to a Berlin resaw and split up into the required thicknesses. Thence it goes to a double surface planing machine, where it is planed. It is now cut into the required lengths,



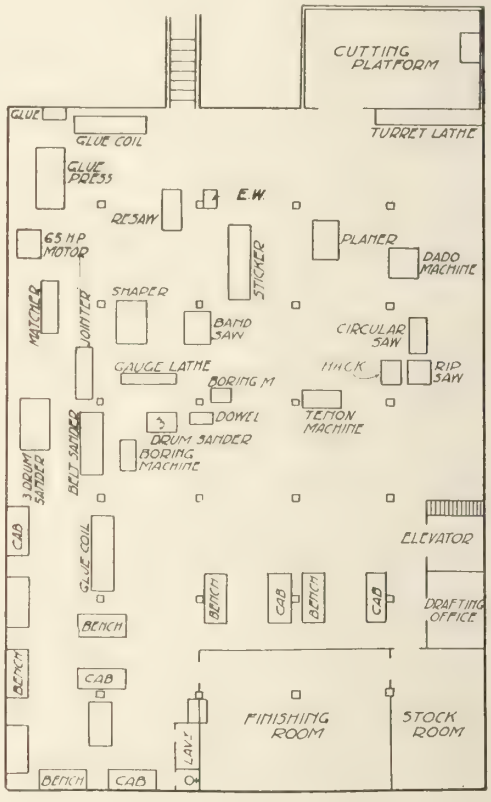
Layout of First Floor.



Layout of Second Floor.

as in the case of the butter boxes, by the cut-off and rip saws. These lengths are then put together on the Linderman glue jointing machine. This machine matches, glues and puts the pieces together at one operation. The tanks in the machine are steam-heated. These parts now proceed to the screw-driving machine, where the handle cleats are screwed on to the ends. Thence the box goes to the nailing machine, which drives twelve nails at once. This frames up the box. The box then slides down a bench to another nailing machine which puts on the bottom, driving nine nails in at once. The box now proceeds to another nailing machine, which puts nails in the sides of the bottoms. The top is now tied in place by tarred cords to staples in the ends of the box. This completes the nailing operations, and the box is now ready for inspection by the Government officials. All ammunition boxes are stamped at the factory by Government officials before leaving for their destination. Each shell box holds six shells, as may be seen in illustration No. 7. This picture shows the special interior construction of a Government shell box, and it shows how the shells lie in compartments specially prepared for this purpose.

On this floor there are four sets of cut-off and rip saws for cutting up lumber for boxes. There is also



Layout of Third Floor.

one Linderman dovetail jointer and self-feed rip saw machine complete with glue tanks. This machine, which is over 42 feet in length, was supplied by the Canadian Linderman Company, and makes Linderman joints and glues lumber, the saw being for ripping the lumber into the required widths after being matched and jointed together. This machine is used for the finer class of boxes on account of the stress and neatness of the resulting joint as compared with the ordinary tongue and groove. As a matter of fact, this machine is kept busy in preference to the regular groovers, on account of the saving in lumber and the superiority of the finished box. Lumber matched together on this machine is said to be stronger than solid wood itself, and where glue is used it is very seldom that a break can be made in the joint. Where it is not possible to make the whole box with this process, either the ends, sides, tops or bottoms are so combined with those made on the ordinary groovers

as to produce a package which is amply safe and strong for the weight to be carried.

There is also a double surfacing machine for planing lumber on this floor. This machine was supplied by Cowan & Company, of Galt, Ont. There are also a Berlin resaw machine for resawing purposes, a McGregor-Gourlay self-feed rip saw, and a slab resaw for ripping up logs.

Boiler Room Equipment

The Atlas Corlis Engine Company supplied the equipment for driving the plant. This engine develops 100 h.p. and takes care of a large portion of the machines to be driven. In the boiler room is found a dynamo for generating electricity for lighting the plant. There is a breakdown connection on the switchboard connected with the Winnipeg Street Railway power plant, and another with the city power plant, in case of a breakdown in the electric plant of the factory. There is one Cookson heater for heating feed water for the boiler, also one large pump for pumping water to the boiler. The large boiler was supplied by the Manitoba Bridge & Iron Works, Winnipeg, and is surrounded by an iron floor in order to minimize the fire risk. There is a spare boiler room next to the large boiler. This is at the present time being utilized as a dry kiln room, and what a dry kiln room it makes! It is doubtful whether there is another such dry kiln in Canada. In the basement of the boiler room there is a Marsh automatic pump and receiver to collect condensation of heating system in winter, the water flowing back into the tank and this automatic pump pumping the water back into the boiler. There is, in connection with the boiler room, a brick shavings vault, which holds surplus shavings and sawdust. These shavings are deposited into this vault by the exhaust fan. By special dampers these shavings can be placed direct into the boiler. Another small fan blows the sawdust into the sawdust bins, having five outlets in

View on first floor, showing Berlin Resaw.

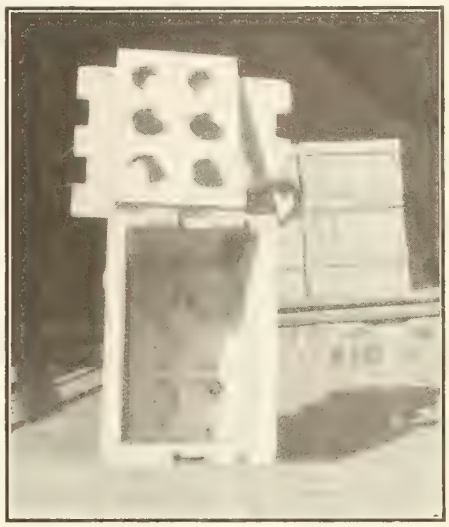
order to facilitate the easy filling of sacks placed under the outlets.

Filing Room

There is a well-equipped filing room on this floor, having the following equipment: Sharpening and brazing saws; one automatic grinder for grinding planer knives; an automatic grinder for grinding saws for brazing; a Covel stretcher for tensioning saws; an anvil for hammering; a sharpener for sharpening saws; one emery wheel; one 13-foot engine lathe; one screw cutter and power drill, also all kinds of machinists' tools necessary for taking care of any kind of repair work.

Third Floor Lay-Out

This floor is where the cabinet department operates. Here all finishing work is done. The draughting department of the factory is situated on this floor. A special draughtsman is employed to make detail drawings of all orders for the various departments. The different workmen are then given their drawings and detail sheet from which they work. This makes the



View showing inside construction of Shell Box.

bookkeeping system of the factory a very simple one, and errors rarely occur. The workmen also are more careful regarding any spoiled work than otherwise would be the case. A description of the cost system is published in this issue.

There are five separate departments on this floor. One is used for the draughtsmen, another for the stock room, another for the staining room, another for the finishing room, and the remaining space is used for the main work of the cabinet department.

There is a special saw table for sawing or for using dado heads. Special saws can be installed to make either dado or do ordinary saw work. The dado machine was supplied by the American Woodworking Machinery Company. A wood-turning lathe is also situated close to this saw table. This lathe is used for turning table legs, couch legs, and similar articles. Then there is a double surfacer which is really a planing machine. A 13-in. Jackson-Cochrane sticker is used for all kinds of molding. An emery wheel with 10-inch wheel is situated on this floor. Close to this is a Cowan resaw. There is also a chain mortising machine for mortising wood. On this floor is also an iron table double head dado machine for performing different jobs. The Berlin Machine Works supplied a glue jointing machine which tongues and grooves the lumber for gluing. A 65 h.p. motor for driving certain machinery in connection with the cabinet department is used as a spare in case of a breakdown. A glue tank, steam heated, and a glue coil to heat lumber before placing the glue on, are situated on this floor. The glue coil (also steam heated) is 12 feet long by 6 feet wide. There is, close to the glue coil, a gauge lathe for turning wood, also a jointer, 7 ft. by 18 ins., which joints the edges of the lumber. Other equipment on this floor includes a Berlin sander for sanding purposes, belt sander supplied by the Hespeler Machinery Company, Limited; mortiser and

drum supplied by Greenlee Bros. Company; a machinist's vertical boring machine, 7 feet high, for boring iron; a radial boring machine, which bores two holes at once; a dowel machine, 4 sizes, ⅜-in., ½-in., ⅝-in., and ¾-in., supplied by the Tannewitz Builders Limited; a groover machine supplied by the Levi Houston Company; cut-off and rip saws. Room is provided for three extra benches. Situated in one corner of the cabinet room is a heating coil, 10 feet long by 3 feet wide, steam heated, for heating lumber before it is glued.

As already mentioned, there is a special draughting department in connection with this factory. This is in charge of Mr. Gross. Designs are drawn, details made up and stock bill filled in by Mr. Gross. All kinds of special furniture, drug store fixtures, store and office furniture, cases for phonograph records, mantels, sideboards, china cases, telephone booths, furniture frames, chairs, tables, couches, red cedar chests, restaurant fixtures, counters, in fact everything in cabinet work, is designed in this department and made in the factory.

Mr. C. F. Czerwinski

The president of the company is Mr. Charles F. Czerwinski. Mr. Czerwinski was born in 1863 at Markham, Ont. His father was a Pole and his mother of Highland descent. He received his education at the public schools in the county of Wellington. Up to 1885 he worked on a farm, after which he followed the trade of a brick contractor in County Wellington, Ontario, and later on was engaged in connection with the furniture and milling business at Mount Forest, Ont. He came west in 1890. Mr. Czerwinski is a well-known citizen of Winnipeg, and has been a member of the Canadian Manufacturers' Association for a number of years.

The secretary-treasurer of the firm, Mr. W. McCormick, is also superintendent of the factory. To him we are indebted for much of the information in connection with this article. Mr. McCormick is an Irishman, and has been many years in the woodworking trade. A quantity of the machinery installed in the cabinet department was erected by him. He is assisted in the cabinet department by Mr. H. C. Eaton.

Box Factory Cost System

The cost system of the Czerwinski box factory is one which shows the progressive spirit of the management of this firm. It is unusual to find in a plant such as this a system so simple and yet so effective, labor saving, and economical.

When an order comes in, it is first of all turned over to the order clerk, who in turn sends it to the draughting room. A special man is employed there to make drawings of all new jobs. This is described in the previous article. The draughtsman makes a scale drawing, a detail in duplicate and a stock bill. These are sent to the superintendent, who hands the stock bill to the stock sawyer. When cut from stock it goes to the trim sawyer. He receives the scale drawing, detail and the stock bill. It is his duty to distribute the material to the different machinemen—the jointer, gluer, sanders, nailers, sticker, tenoner and mortiser. Then it goes to the cabinet maker. Here the cabinet maker keeps the detail drawing before him and constructs his article accordingly, checking up his quantities with the stock bill. In this way an error rarely happens.

The cabinet maker frames the order according to the drawings, glues his article, as is shown in plan, and when complete it goes into the finishing room. Here the finisher puts on one coat of stain, one coat of shellac, two coats of varnish, and rubbed down to H. L. finish. From the finishing room it goes to the fitting room, where glass and hardware are fitted. From there the article goes to the shipping room with the stock bill and order sheet. The stock sheet is now turned back into the office, and the scale and detail drawings sent back to the draughting room. The cost bill is turned into the office, where the items are extended by the cost clerk. This entry is then made into the ledger and the bill sent to the customers. In

Order No. 500 Stock Bill Date 9-18-15

Bill No. 1 **CZERWINSKI BOX COMPANY, LTD.** Finish Regular Mahog

Note Cut one time For Manitoba Government Telephones 60

Booth Article 7'×2'3"×2'3"

No	Pieces	Length	Width	Thick	Lumber	REMARKS	Footage
1	2	6'3"	3⅝"	1⅛	Birch	Door Styles, groove & dowel (see detail)	
2	1	1'4⅛"	3½"	"		Top rail ten ½" by 15⅛ dowel	
3	1	1'4⅛"	6"	"		Centre " " ½ by 15⅛ "	
4	1	1'4⅛"	7½"	"		Bottom " " ½ by 15⅛ "	
5	1	2'4⅞"	11⅛"	⅜	5 ply	Panel in stock Birch fit groove	

Fig. 1—Stock Bill for One Door Complete.

JOB NO. NAME

ORDER NO ADDRESS

WHEN ORDERED WHEN WANTED WHEN SHIPPED

QUANTITY	NUMBER	SIZE L. W. D.	THICKNESS S. T. & B. ENDS	STYLE	ARTICLES

Fig 2—Main Order -Made out in duplicate.

Shop Order No._____ **CABINET DEPT.**

_____ 191_

Name Workman_____ Check No._____

No. Pieces_____ Article_____

Operation_____

Instructions_____

DATE	7	8	9	10	11	12	2	3	4	5	6	Total Time

Must be left with Foreman when Job is Completed. Foreman's O.K._____

Foreman must return this sheet to office on Completion of Job.

Fig. 3—Cabinet Maker's Time Sheet.

Fig. 5—Information regarding finished job—This card is kept in filing case for future reference.

Dept._____

See File No._____ Card No._____

EMPLOYEE'S RECORD CARD

Name_____ Applicant's No._____

Address_____ File No._____

Position_____ Work_____

Date First Employed_____ Check or Clock No._____

Nationality_____ Can. Citizen_____ Age_____ { Married / Single

Trade_____ Rate Per_____

Change of Wages	Date													
	Rate													

Date Quit Cause

Date Discharged Cause

Transf'd To	Dept													
	Date													

Fig. 4—Employees Record Card—Record of Spoiled Work on Reverse Side.

RECORD OF WORK SPOILED

Date													
Parts No.													
Cost													

REMARKS

Reverse Side of Employees Record Card.

Forms used in connection with the Cost and Record System of the Czerwinski Box Company, Winnipeg.

olden times an extra man was required to lay out work in the different departments, whereas in this system this man is not required.

In the office is a filing cabinet where records are kept of small jobs, showing detail of work, total cost of material, overhead expenses, cost per piece of material, total cost per piece for labor, total cost per piece, percentage of profit, etc. Other files are delegated to jobs dealing with (a) chairs, (b) chiffoniers, (c) doors, (d) couches and Davenports, (e) tables, (f) miscellaneous. A record is also kept of present employees and of those who have left.

In order to better understand the cost system it is necessary to refer to the different forms. Fig. 1 shows the stock bill. This bill is made out in duplicate in the draughting department. An example is shown how this is filled out for the construction of a door complete. Fig. 2 shows the main order. This is made out in duplicate, the duplicate being kept on file until the job is complete. When the job is complete, this duplicate is destroyed. This makes an excellent follow up system. Fig. 3 shows the time ticket of the workmen belonging to the cabinet department. This is attached to the order form and turned into the office. Fig. 4 shows the employee's record. This is a very interesting record to have on file. It is especially important because it contains on the opposite side a record of work spoiled, the date, parts, and cost, with remarks. Fig. 5 shows the detail information of every job which leaves the factory. This information when kept on file is extremely important, for when a job comes in similar to one which the firm has had before, the officials can instantly see a comparison of costs, and so rectify any previous errors made, or make suggestions to have that work done in a more economical method.

The Right and Wrong Way of Nailing Boxes

The National Association of Box Manufacturers have issued the following suggestions for nailing boxes:

The number of nails to be used for a given box is determined by adhering to the rule of spacing nails approximately two inches apart, except when nailing up boxes where sides, tops and bottoms consist of more than one piece. In such cases, make sure the narrow pieces have at least two nails in each nailing edge and more if necessary to comply with the rule for two-inch spacing referred to.

Side Nailing: Space nails not to exceed eight inches apart. Use at least 4d cement coated nails. Use larger nails if sides heavier than one-half inch.

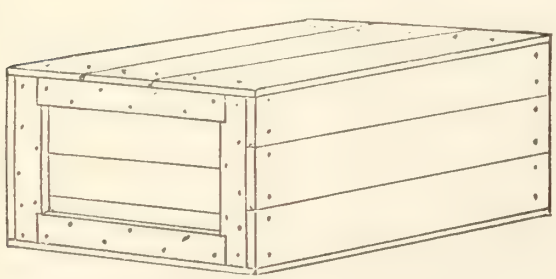
Schedule for the Nailing of Soft Wood Boxes

1/4 in.	thickness	use 4d Cement Coated Nails
3/8 in.	"	use 5d Cement Coated Nails
7/16 in. or 1/2 in.	"	use 6d Cement Coated Nails
9/16 in. or 5/8 in.	"	use 7d Cement Coated Nails
7/8 in.	"	use 8d Cement Coated Nails

Schedule for the Nailing of Hard Wood Boxes

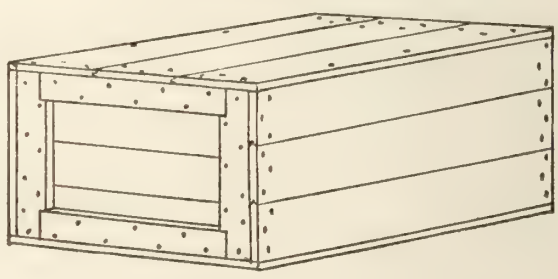
1/4 in.	thickness	use special large 3d or regular 4d Cement Coated Nails
3/8 in.	"	use 4d Cement Coated Nails
7/16 in. or 1/2 in.	"	use 5d Cement Coated Nails
9/16 in. or 5/8 in.	"	use 6d Cement Coated Nails
7/8 in.	"	use 7d Cement Coated Nails

THE WRONG WAY



1. Not enough nails.
2. Nails driven in straight line, all in end grain.
3. Nails driven in cracks.
4. No side nails.

THE RIGHT WAY



1. One-third more nails.
2. Nails properly staggered and tipped.
3. Nails all driven into stock.
4. Side nailed.

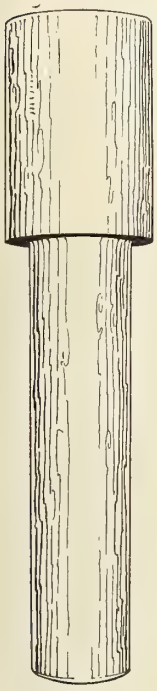
If the above suggestions are strictly adhered to, it will add greatly to the carrying strength of wooden boxes.

We are sending this nailing specification to shook consumers and users of boxes, and ask their co-operation for the better nailing of packages.

We show two cuts of boxes which demonstrates the right and wrong method of nailing. Won't you please co-operate with us to the extent of instructing your nailers to make sure that your boxes are nailed the right way?

Large Output of Wooden Gaines

While the manufacture of shell boxes has kept a number of woodworking and furniture factories going this past year which otherwise would have been shut down, that is not the only demand made upon the plants by the Militia Department. Thousands of packing cases have been required for transporting supplies, etc., consuming a large amount of lumber, particularly hemlock. Orders have been placed for hundreds of armorers boxes. These boxes are made of hardwood, solidly constructed, partitioned into compartments and finished in the best cabinet finish on the outside.



Wooden Gaine.

The manufacturer of wooden gaines is another product of the war that is assuming large proportions, as one gaine is used for every shell manufactured. The wooden gaine, made of birch or maple, is used to place in the shell when it is being filled, to shape the soft cordite as it is put in, acting on the same principle as a wooden pattern in a moulder's shop. When the cordite is set, it is removed, and the steel gaine placed in position. The wooden gaine, a drawing of which is here shown, must be absolutely accurate in every detail, finished to the finest degree, particularly on the edges, so that on removal the slightest particle of cordite may not be misplaced, and the steel gaine may fit accurately. The wooden gaine is six inches long; 1 5/10 inches in diameter from the top down two inches to the shoulder, from which it tapers gradually from 900/1000 inch to 850/1000 inch. The fillet or radius at the shoulder is .05, or 5/100 inch. Absolute accuracy must be maintained as to the dimensions and the gaine when finished must be shellaced to give an absolutely smooth surface.

Piano and Organ Manufacturers

The annual meeting of the Canadian Piano & Organ Manufacturers' Association was held in Toronto on November 15 last. In point of attendance, representation and discussion, it was one of the best meetings ever held by the Association.

One of the most important subjects discussed was the necessity of a minimum basis for credit sales. It was decided to again send out a circular letter bringing this matter to the attention of the retailers, who have been asked to endorse the following as a minimum basis for future credits:

"That not less than five per cent. of the sale value be required to be paid down on all sales of pianos, organs or other musical instruments, and that monthly payments equal to at least one-half of the initial cash payment be demanded."

The giving away of accessories to stimulate sales is a subject that was again discussed. Some firms were said to be breaking the spirit of a former resolution by supplying benches instead of stools with piano sales. It was decided to modify the agreement in so far as benches and stools were concerned, by adopting the following resolution:

"That accessories be limited in sales of pianos to either a bench or a stool, but that neither of these articles were to cost more than $5.00."

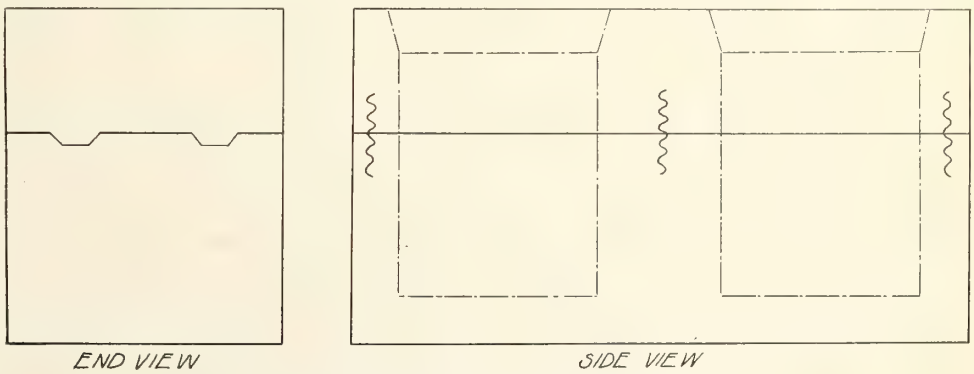
It was suggested that action be taken by the Association to induce the Government to increase the duty on imported pianos and musical instruments, but after discussion it was thought inadvisable to take any steps at the present time. The matter of export trade was discussed, but no joint action taken.

The election of officers resulted as follows: Honorary President, David Allan, Bell Piano & Organ Co., Guelph, Ont.; President, H. Sykes, Secretary Thomas Organ Co., Woodstock; First Vice-President, G. Y. Chown, Wormwith Piano Co., Ltd., Kingston; Second Vice-President, C. A. Bender, Heintzman & Co., Ltd., Toronto; Treasurer, Fred Killer, Gerhard Heintzman, Ltd., Toronto; Secretary, James G. Merrick, 4 Queen Street East, Toronto.

End Blocks for Shell Boxes

To. Mr. G. Conrad, superintendent of W. C. Edwards & Company, Limited, Ottawa, the Canadian Woodworker is indebted for the accompanying sketch showing a clever method of making end blocks for four-round, 18-pounder shell boxes, by means of which less valuable lumber can be used and a considerable saving thus made. In sending the drawing Mr. Conrad writes:

Owing to a shortage of suitable 4-in. white pine, the Shell Committee authorized and approved of a block made of two pieces put together in this manner. In order to use a grade of stock containing imperfections that are not admissible in the blocks, it is obvious that the stock must be cut up before being put together. We work the stock to detail shown, then cut to length. Glue is applied and the blocks are put in special clamps each holding three complete blocks. The clamps, with the blocks, then go directly to a splicing machine which drives three 5/8-in. corrugated fasts at a time. With fasts driven, the two parts of the blocks are held firmly together and released, ready to be bored. We bore and countersink both holes in the blocks at one operation.



Method of putting together End Block made of two pieces.

Mr. H. Riley, foreman of the woodworking factory of Henry Morgan and Company, Montreal, is recovering from a serious attack of diphtheria.

System and Ingenuity in Box Making

A Description of the Method of Manufacture and the Equipment of the Beverley Wood Specialty Company's Plant

One of the first plants in Canada to secure an order for the production of shell boxes was that of the Beverley Wood Specialty Company, 91 Niagara Street, Toronto. The box which they are manufacturing is known as the 18-pounder, 6-round shrapnel and high explosive box. At first, this box was used only for shrapnel shells, but it was found that by a very slight alteration in the top tray it could also be used with perfect satisfaction for high explosive shells. This alteration was made in the specifications and the box is now capable of being used in either way.

A corner of Shell Box Assembling Room—Beverley Wood Specialty Company.

At the plant of the Beverley Wood Specialty Company, lumber is received from the car right alongside of a swing cut-off saw, furnished by Cowan & Company, of Galt. At this machine the lumber is cut into sizes suitable for the Linderman dovetail glue jointer. Then it is piled on trucks and conveyed to the Linderman machine, where it is glued and dovetailed together in suitable sizes. Then the stock is put through a double surface planer, manufactured by Baxter D. Whitney & Son, Winchendon, Mass. This machine operates upon the dovetailed stock and turns it out ready to be cut to size for the boxes. The stock then travels on trucks from the planer to a Cowan automatic cut-off saw which reduces it to the sizes required. A Cowan dado machine comes into operation next and finishes the stock ready for the box nailer.

The two trays, top and bottom, which are inserted inside the boxes, are handled by a Cowan boring machine. In this machine the Beverley Wood Specialty Company use a bit which they have designed and made for themselves. This bit makes the necessary six holes in the trays, into which the tops and bottoms of the ammunition fit. The bit is a most ingenious one, by means of which the holes are bored without ever splitting any of the wood. Inside the cutters of this bit is a flat circle of steel operated by a treadle, which pushes out the core cut by the bit. This machine can be operated on combination speeds; that is to say, the output can be doubled if necessary.

The handle cleats attached to the outside of the box by strong screws are all made of material which would otherwise go to waste. These are of some good strong hardwood, such as birch, maple, oak, etc. They are put through the Cowan sticker sideways, a special arrangement of the machine having been made for this purpose. The cleats are then handled by a boring machine where the five screw holes are both bored and countersunk in one operation.

The above description explains the method of producing the various pieces which are assembled into the complete box. The Beverley Wood Specialty Company do all their nailing of shell boxes by hand and thus give employment to a larger number of men than they would otherwise. The iron bands are all put on with automatic screwdrivers.

The only other material entering into the composition of the box is the rope for the handles. The handle is made from a 30-in. piece of ½-in. tarred manilla rope of the best quality obtainable. This is passed through the hole beneath the cleats and its two ends are carefully spliced.

The top tray referred to above is somewhat different from the lower tray. The holes in it are bored

A section of Trimming Department on Machine Floor—Beverley Wood Specialty Company.

out with an auger bit. The edges on both sides are then chamfered with a shaper. By turning the top tray upside down the box can be used for high explosives. When it is turned right side up it is used for the shrapnel shell. After the box has been completed it is inspected by the company's foreman and passed along for the final Government inspection. The Beverley Wood Specialty Company have had an excellent record in this connection, their rejections amounting only to about 2½ per cent. Views showing the operations of shell box making will be seen on these pages.

The Beverley Wood Specialty Company is a comparatively young firm, having commenced operations about six years ago with a very small plant and staff. This has been increased steadily until to-day the firm is one of the most important woodworking companies in Toronto. The plant is equipped with some of the most modern woodworking machinery, including a number of special machines designed by Mr. A. B. Beverley himself. The firm have specialized in cabinet work of the office type, of which they still carry on quite an extensive production. The plant has excellent facilities for shipment of its product, being conveniently located close to railroad sidings. The building consists of five floors and basement, the area of each floor being 50 x 80 feet.

From the kilns the lumber is taken into the cut-off room in the basement, where all the roughing out and sticking is done. In this department the equipment includes a cut-off saw, two rip saws, buzz planer and sticker. The shavings and trimmings throughout the plant are conveyed by a Sheldon automatic blower to the boiler room and are utilized for fuel, providing heat for the entire plant in winter and for the operation of the dry kilns and glue heater. A constant temperature is maintained in the storage sheds throughout the year, so as to ensure a supply of the best class of raw material for the operation of the plant. In normal times, a wing on the shipping floor is utilized as a box making department. This department ordinarily turns out about 100 boxes a day.

The first floor contains the trimming department, where all the veneer work is done. This floor, like all others in the plant, is splendidly lighted and ventilated. The equipment in the trimming room consists of three trim saws, one buzz planer, one Whitney shaper, one Westside band saw, one double spindle boring machine, one double head tenoner, one upright hollow chisel mortiser, one 36-in. Whitney cabinet planer. Nearly all the rest of the equipment in the plant was furnished by the Cowan Company, of Galt. After passing through the basement and being roughly cut to size, the lumber is put through the sticker and goes by an elevator to the trimming room, where it is glued and trimmed. Then it is taken to the next floor for sanding. Next it goes to the bench room and cabinet shop, and finally to the finishing room.

The glue room, located next to the trimming room, is about 50 feet square, and its equipment includes an Advance patent glue heater and an Advance veneer press capable of accommodating a 36-in. x 120-in. panel. Another glue press is also in operation for special coring stock.

The sanding room on the second floor contains one 42-in. Berlin three drum endless bed sander; one Lucas belt sander; one 24-in. single drum sander; one special sander manufactured by the C. Mattison Machine Works, Beloit, Wis.; one special sander, designed by Mr. A. B. Beverley, for all kinds of belt edge work; a dovetailer and shaper, designed by the company; also a Jackson-Cochrane shaper and a Ballantine type trim saw.

Hydro-Electric power is used throughout the plant.

Sanding Department—Beverley Wood Specialty Company.

To Lighten the Planer Load

The subject of how to lighten the load or power requirements of a planer is offered by way of diversion from the more generally discussed subject of how to make the planer do more work, even though it pulls harder, and in many instances information on this point should prove valuable to users of planers. There are many operators of plain surfacers who have only limited power at hand with which to drive them, and with these it is often quite an item to lighten the burden of work so that it may be done with the least practical amount of power.

Take the ordinary two or four-knife cutterhead, and if the knives are ground rather blunt and are operated for a long time before changing, they pull very heavily. The way to lighten this load is to grind the knives frequently and grind them thinner, with more bevel. That is what makes light cutting and lessens the power requirements for driving machines.

Of course, it should be borne in mind that there is a difference between lightening the load and doing the smoothest work. Getting the smoothest work is often secured by making as short a bevel as the machine will stand, then keeping the knives on the head some time. In the course of using and whetting down to an edge, imperfections in setting are corrected so that all knives cut more nearly alike and a better finish is secured. To follow this idea to an extreme, however, means making the planer pull heavily. On the other hand, following out this idea to the extreme thin grinding of knives, makes the planer inclined to cut a little wavy, unless it is nicely balanced—The Woodworker.

Cabinet Room D. Hibner Furniture Company Showing men busy on shell boxes.

A Visit to the Hibner Factory at Berlin

The manufacture of shell boxes was seen to be an interesting operation at the plant of the D. Hibner Furniture Company, Limited, Berlin, Ont. Mr. D. Hibner, the president, always extends a hearty welcome to visitors. He first took our representative out to the yard, where a gang of yard men were unloading shell box lumber from cars into the dry kiln, which has a capacity of 75,000 feet. It is then transferred into two fireproof concrete lumber sheds, where kiln dried stock is stored. Some of the lumber is transferred direct from the kiln, by means of transfer trucks over a large turntable, into the cutting room. From there the stock is moved on trucks to the Linderman jointer, then to the planers and stickers, then to the elevator man who transfers the stock to the second floor. It is then fed through a double automatic machine, which delivers the sides complete, and then, along with the ends, through a dovetailing machine. After this operation the stock passes to the cabinet room, which is 180 x 67 feet, with a wing on the east side 72 x 55 feet. This room is partly shown in the first illustration. Here one man puts the glue on the dovetails with an automatic brush and another sets up the boxes temporarily for the automatic clamp,

Shipping Room D. Hibner Furniture Company—Completing the Boxes.

while another man tacks on the bottoms with nails. From there they pass on to a man who bores 18 screw holes at a time, handing them over to the screw machine, and so on until the box is completed, loaded on a large truck and moved to the shipping room, shown in the second illustration. This room is 85 x 50 feet, and here the boxes are stored for inspection by the Government Inspector—the second figure from the left in the illustration. One man is entering the two screws on the lid, the next is drawing the screws, and the third is shooting them down into the car at the window through a chute, where they are received by the three men who are loading the car.

The reporter asked Mr. Hibner if there were many rejects, and he said: "In the last three carloads there were six boxes with a few sides split and one with a few loose knots. The foreman has strict orders not to pass anything which is not permissible; hence, we have few rejects. We claim we have one of the best shell box outfits in the Dominion of Canada."

Woodworking Conditions in Montreal

(Staff Correspondence)

Leaving out of consideration the factories employed on boxes for the British Government, woodworking firms in Montreal have had a rather lean year. The great bulk of such firms are manufacturers of sashes, doors, and interior trim; next in importance are the box makers; and then there are a few furniture manufacturers engaged for the most part on goods made to order, and turning out some very high class productions. In addition we have two or three piano factories and a limited number of factories making minor woodworking appliances.

The Shell Box Orders

The shell box business proved the most important feature of the year, and the distribution of the orders caused much discussion and irritation. No one can pretend that the allocation of the work was satisfactory; it was given out on no fixed principle, and there was, and is, a natural feeling that a great injustice was done to the woodworking industry by the awarding of orders to companies who had not the remotest connection with the industry. Firms in the box-making and sash and door trades, well equipped with machinery, made repeated and vain efforts to get a share of what to them is their legitimate calling, while companies who had to specially install equipment were able to secure large contracts. While it was perhaps not possible to satisfy all applications, greater care ought to have been taken so that only bona fide woodworking firms obtained business. It is clear that the stringent criticism of the old committee was not in vain, for it is reported that the reconstituted committee have called for tenders for the next lot of boxes, and it is probable that more judgment will be exercised in placing new contracts.

Dry Lumber Scarce

The demand for lumber, particularly of spruce and birch, was greatly stimulated, and the wholesale dealers found that box lumber was a most important portion of the year's trade. There was an immense call for 9 and 10 in. dry stock. The province of Quebec was ransacked for suitable lumber and some was sent from the Maritime Provinces. Inquiries from Ontario and the United States came in at a good rate, many buyers from over the border visiting Montreal in the hope of picking up the required wood. Under these circumstances, prices have had a strong advance.

Sash and Door Trade Dull

Only a limited number of shell boxes have been made by sash and door makers; the other firms, as in former years, had to depend mainly on building construction, and the fact that building permits show a sharp decline is sufficient evidence of the inactivity in that direction. It is true that in the province of Quebec, thanks to a good harvest and high prices for produce, building was by no means unsatisfactory, and that a considerable amount of work was ordered in Montreal for the small towns and the villages, but this did not counterbalance the decrease in Montreal. Some of the factories had fairly good contracts left over from last season and others turned their energies to certain ecclesiastical work. This resulted in keener competition for this particular class of woodwork.

The Box and Piano Sections

The box manufacturers have not been busy (except those with shell box orders), this remark applying especially to the first part of the year, but lately, with general business picking up, there was a little more doing. The furniture makers were severely hit by the war, and in order to keep their factories running two of the largest concerns secured substantial box contracts. People who were accustomed to order expensive furniture economized, thus affecting the output of the furniture manufacturers. The enforced reduction of expenditure also caused a decline in the demand for pianos, and in addition the raw materials entering into the construction of the instruments advanced to a considerable extent. It is satisfactory to learn, however, that a distinct change has lately been noticed in this branch, the orders coming in much more freely.

Prospects for 1916

What are the prospects for the coming year? These depend upon a variety of circumstances, such as the continued orders for shell boxes, the building trade, and general business conditions. A majority of the woodworking plants rely upon building for the bulk of their work, and while it is too much to expect anything like a pronounced revival here, it is probable we shall see more activity in the contracting end. The improved condition in the piano trade is encouraging, as it indicates that people are showing more confidence. Should general commerce continue its upward course, it is bound to affect the furniture trade, the ordinary box business and other sections of the woodworking industry. The manufacture of shell boxes is, of course, dependent upon the war situation, and the outlook in that direction is favorable for a continuance of orders for the British Government. On the whole, the position is that 1916 will be a brighter year than the one which has now nearly run its course

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The ratepayers of Stirling, Ont., will this month vote on a by-law to bonus a box and basket factory. The promoters are John M. Wallace, Davey Chapman and John S. Marshall, all of Oakville, Ont.

Making Shell Boxes in Furniture Factories

By "Foreman"

Most furniture manufacturers who have taken orders for shell boxes in order to keep their plants running found that a re-arrangement of the working conditions of their factory was needed.

The only shell boxes, properly so-called, are those used to transport the high explosive shells and the steel shrapnel from the various factories where they are produced, when they are charged with bullets and the filling compound, to the explosive factory where the brass cartridge containing the propelling charge of cordite or other smokeless powder is attached.

The shell box, then, will be seen to be merely a carrying box, and is made to be used over and over again. Each box is provided with two handles made of ½-in. tarred marlin rope spliced in a circle and secured to the end of the box by blocks of hardwood, commonly called handle blocks; these are grooved to receive the rope, and are fastened with five screws. Each box is reinforced by two steel bands. These extend around the sides and the bottom of the box and to within two inches of the top on either side; these also are fastened in place with screws.

The ammunition box is designed to carry loaded and fused cartridges from the factories where the shells are assembled, loaded and fused, to the ammunition bases in the field and elsewhere. This box is dovetailed on the corners, the tops and bottoms being screwed on. The handles on this box are of galvanized iron rope spliced and whipped across the handhold with tarred marlin. These are fastened to the box with handle blocks grooved to receive the wire rope and screwed to the end by five screws. This box also is reinforced with steel bands, these being a little lighter than those on the other boxes; hence they are fastened by screws of a lighter character.

Many specifications for shrapnel and ammunition boxes call for a wedge dovetail corner using three-quarter inch sides and ends, and having the pins one inch from the centre, while other specifications call for a dressed one-inch side and end, using screws in place of nails and having a metal band drawn around the corner and lapped over the top of the box. Others again call for dressed lumber of even thickness "fifteen sixteenth inch," nailed together with two and a half inch wire nails. All call for screwed tops.

The 4.5 How.-M.K.V/L/ box is made of spruce, except the ends and handle cleats, which are birch or maple. The boxes are nailed together with two and a half inch wire nails, a sheet of iron band is fastened to the bottom and sides by screws, and the lid is provided with battens or cleats on the inside. These are put on by one and a quarter inch wire nails, also drilled with six countersunk holes for screws—one and a half inch No. 12. The inside fittings on the bottoms are V-shaped supports, made of spruce or bass. The handles are attached to the end by handle blocks secured by screws. The external edges are chamfered off. The machining of these boxes is so simple that it is just a matter of systematizing the machine room to handle the work the best way possible at small cost. In drilling the handle blocks for the screws be sure that the holes are countersunk deep enough. The grooving of the handle blocks for the rope handles can be done with the sticker or twisting machine. An automatic screwing machine is a sure saver of time in screwing on the handle blocks to the sides of the boxes; also for the tops.

To begin your cabinet room nailing up these boxes until your machine room is well ahead is a mistake. Be quite satisfied that there will be no slackening up in any section of the work. In the cabinet room there is need of system. Those who have no sandpaper disc in their cabinet room should install one. This will enable you to sand or chamfer off the corners of the boxes, without trucking back into the machine room for this operation, and it will be found to be a profitable investment. Another important factor that will help is to make forms: forms for nailing on the battens or cleats on the lids; forms for nailing on the V-shaped supports on the bottoms of the inside; forms for nailing up the boxes, "inside dimensions." These forms will enable a man to nail the cleats on the lids and the V-shaped supports on the bottoms and to close up the boxes without any trouble whatever regarding measurement, your inside measurements then being according to specifications.

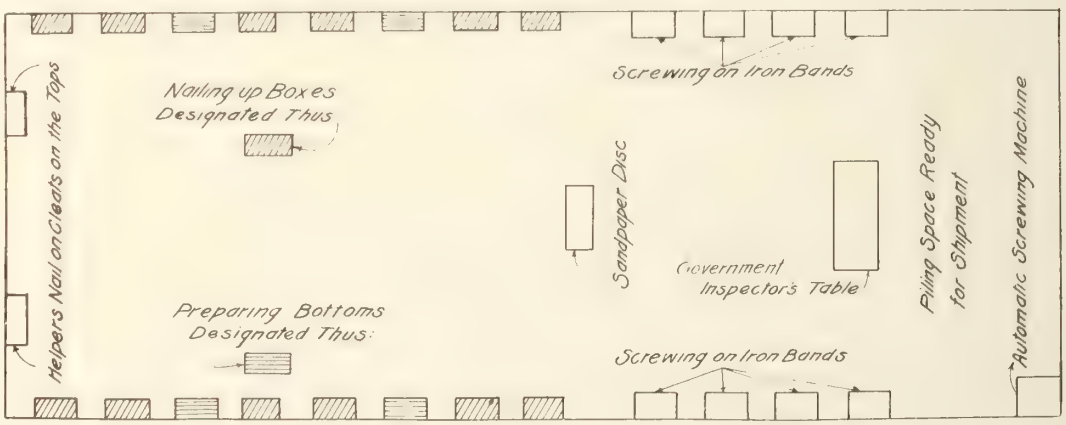

Fig. 1.—Layout of Cabinet Room for Shell Box Making.

The next problem is to consider the laying out of the work. Some factories have given out a quantity of boxes complete to each man, while others have given out a quantity to assemble, excepting the screwing on of the iron bands, this being done in the shipping or trimming room. The most satisfactory way, however, is sectional work. A good system to work upon is

to find out how long each section of the box takes to make and then arrange your men accordingly. The average man will nail up between 130 and 140 boxes a day. A man will prepare or nail the V-supports on 400 bottoms a day—this work can be done by a helper, his output judged accordingly. A man will prepare or nail the cleats on the lids of 600 or 650 a day—a helper can also do this work. A man will screw iron bands on at the rate of about 180 or 200 a day.

Have the handle blocks or cleats screwed on the ends before you assemble the boxes. One man with an automatic screwing machine or an electric driver will do all the screwing that is to be done on these boxes. It is wise to have this operation done in your cabinet room if possible. After having arrived at the time each section will take it will be an easy matter to arrange the work. The writer knows of a factory arranged somewhat on the plan shown in Fig. 1, after

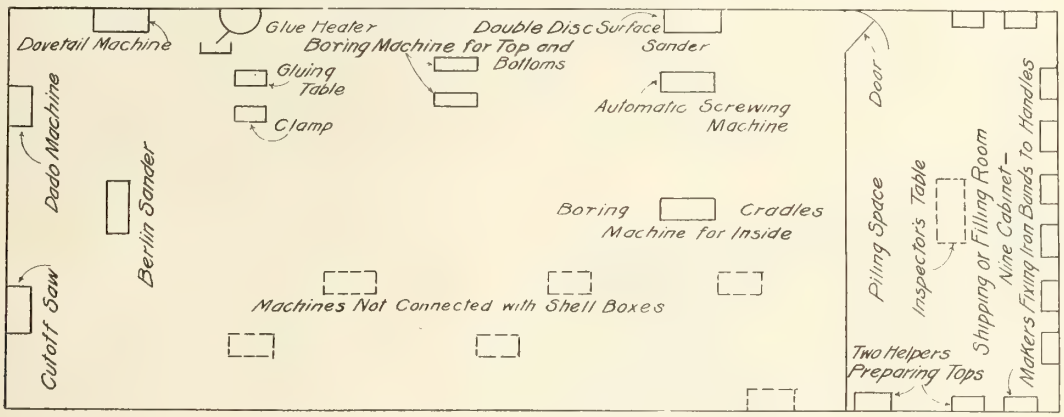

Fig. 2.—A Typical Machine Room Layout for Shell Box Making.

having averaged the work out. The trucking on the above would practically be forward. Two men preparing the bottoms would be sufficient to keep six men nailing up the boxes. Six men nailing up boxes would keep four men putting on iron bands. This principle can be worked by large or small gangs by systematizing the work. The tops of the boxes are screwed on after having been inspected. These boxes can be made piecework—so much for each section.

The dovetailed ammunition box is a long narrow one and carries the shell lengthwise in cradles. This necessitates the boring of different sizes of holes in hardwood in the split divisions, the centre line of which must be mathematically true. The manufacture of this box is somewhat different from the former one, requiring more machine work. Hence, some manufacturers are installing special machinery.

The extra machinery that will be found very profitable and useful is: Boring machines; these machines will bore and countersink all the holes in the tops and bottoms at one operation. A dado machine, specially built for these boxes. An automatic screwdriver, very useful for screwing on the tops and bottoms; some, however, claim that a man can compete with this machine, but if you keep a man or men screwing on the tops and bottoms with a Yankee driver ten hours a day, day after day, until the boxes are completed, the men tire. The machine doesn't tire, and herein is the saving, especially on a large contract. An iron clamp is a very useful thing for the clamping up of the boxes, this being a sure saver if handled properly. A surface sander is being used by some manufacturers to advantage; this machine works upon the same principle as a planer—a drum covered with sandpaper takes the place of the knife and the box is pushed across the machine on all sides precisely the same way as wood. This is a quick operation. However, one objection to this machine is that unless used with great care the work is liable to be wavy, this being the result of the jumping of the box when passing over the drum. A double disc is a very good machine to do this work, and quite satisfactory—quick and clean. A boring machine specially built for the boring of the inside cradles, boring two holes at one operation. In the boring of the handles—the five screw holes—some manufacturers have an attachment fitted to their boring machine that will bore these holes at one operation. The gang dovetail machine is the one generally used. Whatever machinery installed, it should be placed to enable the work to be pushed forward.

Have things so arranged in rotation that the box in its different operations goes forward. Do all the work you possibly can on one floor, even to putting on the iron bands. This cannot be done in all factories for various reasons, want of room, etc. However, most factories can handle these boxes up to the last operation, iron bands, when the boxes can be taken to the cabinet room or shipping room for completion. A typical machine room layout of firms who are manufacturing these boxes is shown in Fig. 2. Here will be seen the box in its various operations—from the cut-off saw to the Berlin sander, on to the dado machine, on to the dovetail machine, on to the gluing table, on to the boring machines, on to the screwing machine, on to the surface sander or disc, then out into the trimming room to be finished off.

Some one may ask how many boxes can be dovetailed at one machine, or glued up. This depends entirely upon the man who handles this particular operation. One man may run the machine to its full capacity, while another may not; the same may be said in the gluing, etc. The average estimate will be found to be somewhere in the neighborhood of 250 to 260. Be sure that the dovetail machine is in good condition and working properly. This will save untold trouble later on. There is no need for the dovetail pins to be chipped or broken. Watch the operation.

The time taken to finish the boxes in the trimming or cabinet room, namely, fasten on the iron bands, screw the handles on, fit the inside cradles, etc., all depends again upon the condition of the box when the last operator receives it. There is no reason why shell boxes cannot be handled in a furniture factory satisfactorily if the manufacturer is willing to adapt himself to new conditions to meet the demand. Adaptation is the keynote to the situation.

Demand for Pianos in South Africa

Mr. W. J. Egan, Trade Commissioner, Cape Town, South Africa, has forwarded to the Department of Trade and Commerce illustrations of a few of the German pianos sold in South Africa prior to the war. They are shown in the Weekly Bulletin No. 615 and are reproduced herewith by permission of Mr. R. Grigg, Commissioner of Commerce.

For a number of years, Germany has supplied the largest number of pianos imported into South Africa. During the past fifteen months several Canadian firms have been furnished with illustrations, prices and methods of packing formerly adopted by German makers, and Canadian makers should endeavor to conform to the requirments necessary to secure this large trade in low-priced and medium grade instruments.

If Canada will produce a piano suitable for the South African market a large trade is assured. One

Figure 1

firm alone in Cape Town are prepared to order one hundred pianos at a time.

The instrument sold most exclusively is a cheap make, light in weight, 50 inches high and about 25 inches deep, with high interior and iron frame. It should be clear in tone, light in touch, and finished in walnut. There is a smaller demand for an oak finish, and a limited number in mahogany, for which a slight advance is allowed, can be sold. The lower grades must be sold from $90 to $120 f.o.b. Montreal or St. John, in zinc-lined cases. Particular attention must be given to the woodwork in order that it may stand the extreme heat of South Africa. It is also suggested that a three-ply properly constructed panel will give better satisfaction than one of solid make. Practically all instruments should have candlesticks, double branched preferably. There is no limit to the fancy decorations, which may be made almost as elaborate

Figure 2

as those used on the cheap grade organ, with the exception of the mirror.

Figure 1 represents a very fancy pattern in the cheaper make. It is a cross stringed instrument, iron framed throughout, ivory keyboard, and is finished in black or walnut polish. The price of this piano was 490 marks, f.o.b. Hamburg.

Figure 2 is an illustration of a German piano, which was sold in large numbers in South Africa, costing 475 marks net at factory. Packing charges were extra. This instrument measures in height 4 feet 4½ inches and is 5 feet ½ inch in width. It is finished in walnut, blackwood, oak or rosewood case.

Figure 3 is an illustration of a German piano, which met with ready sale in South Africa. This instrument was sold at £24 10s. f.o.b. Hamburg, packed

Figure 3

in zinc-lined cases, and for prompt payment there was allowed a discount of 2½ per cent. The maker of this piano had various models, ranging from £22 to £42, which always gave satisfaction, both in the solidity of construction and the action of the piano. The specialty of this manufacturer was the splendid seasoning of his timber, fitting it for the extreme changes of climate in South Africa. This piano is 4 feet 2½ inches in height, and 4 feet 10 inches in width. The case is made of burr walnut, rosewood, or finished in black.

Figures 4 and 5 represent one of the cheapest pianos sold in South Africa, but for which there was a very large sale, the price being 360 marks f.o.b. Hamburg. It will be noticed that the interior is also reproduced, which is cross stringed, having a gold bronzed iron frame and metal rest plank. The keyboard is ivory and the piano is finished black or walnut black. Both of the above instruments were made on contract and sold in very large quantities.

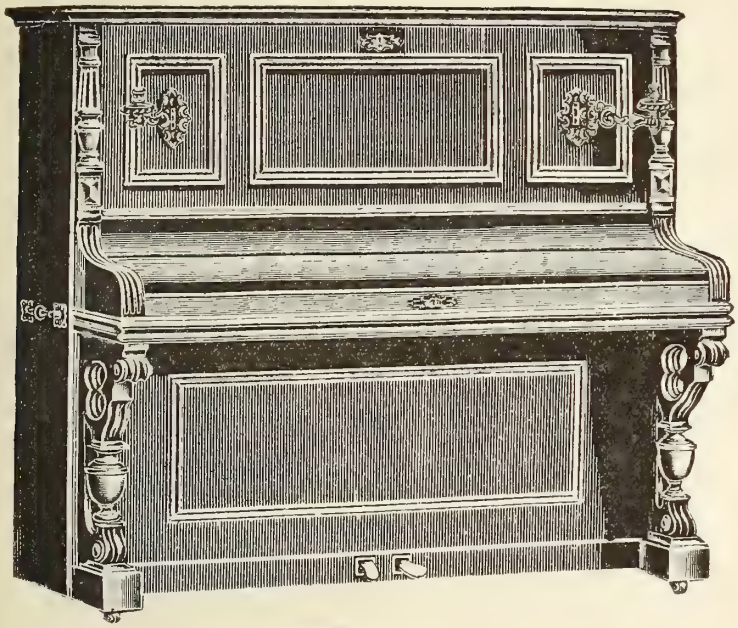

Figure 4—Exterior

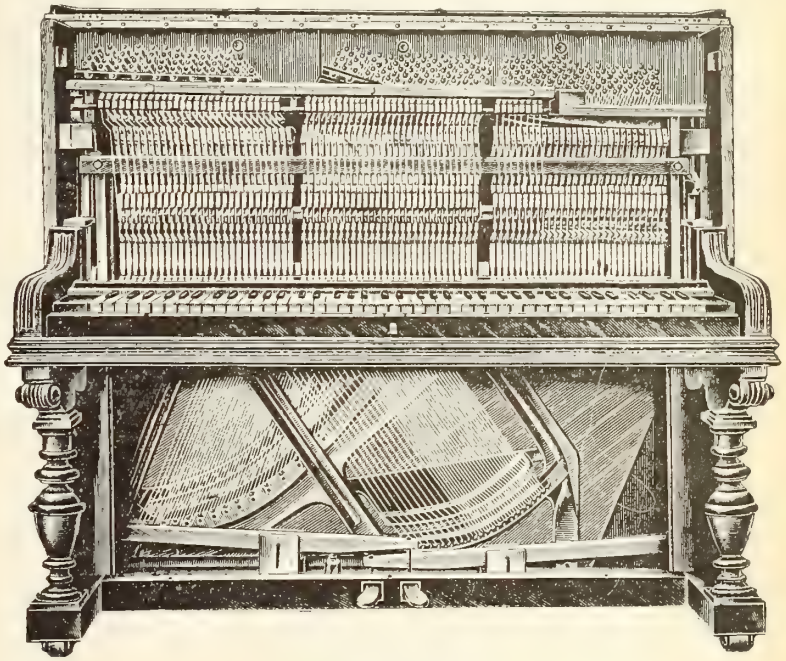

Figure 5—Interior

Differentiating Between Red and White Oak

A great deal has been written regarding the differences between oaks coming respectively in the red and white oak groups, and in fact this has always been a question open to a great deal of discussion both among practical men and among technically trained foresters. Of course, the average lumberman who handles hardwoods is competent to tell the difference between ordinary red oak and ordinary white oak, but there are certain species which are merchantable under each of these headings which come so close to the line of demarcation that it is difficult without some means of positive identification to know in which class they should be put.

So-called scientific methods of identification have been worked out by wood technogolists, but in the main these have been of no particular value to the man handling woods as a business.

Samuel J. Record, professor in Yale Forestry School, has made a thorough study of this question, and after repeated and rigid tests announces a means of simple but absolutely reliable identification which can be easily followed by the most humble inspector without any other equipment than a sharp jack-knife and a small hand lens. This lens can be secured at any optical store for from 50 cents to $1.50. It is necessary that the knife be sharp in order that in cutting off a thin slice of wood at the end of the board the fibers and pores are not unduly nicked.

The test consists in cutting off a portion of the rough surface at the end of the wood, preferably choosing a section which shows a ring of growth of considerable width. Any lumberman can distinguish between the springwood and the summerwood in the oak. It is readily distinguished with the naked eye. Looking at this section then it can be seen that there are light colored patches or lines running somewhat irregularly across it, some appearing like tiny flames. It is these lines which should be closely examined with the magnifier. Examine closely the pores in the summerwood, not the large pores in the springwood. If these summerwood pores are distant and if you can see into them readily and can count them readily, you are looking at a piece of wood from one of the red or black oaks. If, on the other hand, the small pores are indistinct, if you cannot see into them and if there are so many that it is impossible to count them, then if the cut is a smooth one it is a piece of white oak. Surely this is a simple and logical enough test to meet the requirements of any man. The beauty of it is that it has been thoroughly tested out and verified by more complicated and severe methods which go into the more scientific end of wood identifications.—Hardwood Record.

There are many woodworking factories that do very little veneer work, and when one speaks to the superintendent of such a plant about economy in the department he is told that it is not of any interest because the plant is not large enough. As a matter of fact, economy should begin in the small veneer room. It starts with a glue pot and the hand brush for spreading. The amount of glue that can be wasted by this method is surprising. Very often a glue spreader will pay for itself in a comparatively short time, even in a small veneer department.

QUESTION BOX

A Practical Department of Reference for the Practical Man

Ventilation of Dry Kilns

Q.—"Our dry kiln is divided into six compartments, each compartment containing five trucks of 2,500 feet capacity. These trucks enter the kiln at the side, and passing through are taken out on the opposite side when required for use. The heat is applied from coils of steam piping and is forced into the kiln through an excavated tunnel under the floor by a large fan driven at very high speed. Openings in the floor in the several compartments allow the heat to ascend and circulate through the lumber. The exhaust steam from our engine is also conveyed into the kiln through steam pipes laid between the rails under the trucks. We have, however, no ventilation to our kiln other than any crevices there may be around the doors. We would be pleased to have the opinions of dry kiln users of this kind as to the most practical method of ventilating this kiln. Also, could any practical method be employed whereby live steam could be applied direct, so that we could dry green lumber?"

A.—You do not say whether it is hard or soft wood you are drying or for what purpose it is used after it is dried. If it is soft wood, then the design is not radically wrong, but if it is hard wood or mixed hard and soft, then I scarcely see how it is possible for you to avoid case hardening, checking, and in fact all the difficulties of the process. If you do avoid them, it is because there is no ventilation and consequently no rapid means of egress for the humid air which is absolutely necessary for successful drying, and I would advise you to go slow with the ventilation project until we have more information. If you will fill in the attached blank as nearly correct as possible, without going to any great inconvenience, we will take pleasure in giving your problem the close attention it deserves.

A correspondent to whom we submitted the above question submits the following answer:

Your dry kiln is what might be termed an "old timer," and to suggest improvements without seeing the kiln, or having more information on the subject, is somewhat difficult. I assume that each of the six compartments is practically a self-contained kiln, so far as the drying of the lumber is concerned, and that the temperature of each compartment is about the same.

You are decidedly wrong in forcing heated air into the kiln by a fan without providing ventilation or means of returning the cooled air to be re-heated, as it is obvious the pressure exerted by the fan forces the air out through the crevices around the doors, which as a matter of economy should not be there, but as the air must be released in order to create a circulation, under the circumstances they are an aid to the drying of your lumber.

The least expensive method would be to build a return duct to the fan, which would draw the air through a coil of pipes that are kept full of flowing cold water. This causes condensation, which extracts the moisture from the returning air, which then is drawn through the heated coil and forced again into the kiln, being a sort of continuous performance. The inflow and outflow ducts must be so arranged that the air circulates through the lumber before it returns through the return duct, and I fancy this would require some scheming, as your kiln is of six compartments.

The old style blower kilns were always used in connection with a kiln that was oblong in shape and usually had only two compartments, the quantity of hot air being regulated by dampers from the inflow duct that was placed running through the centre and between the kilns, the dampers being farther apart towards the "in" end of the kiln, thus keeping the temperature lower at that end and higher at the "out" end, the air being forced in under the cars and the return dampers being up above, so causing the necessary circulation.

If you simply wish to provide ventilation, leaving the kiln as it is, would advise building ventilators, preferably of hollow tiles, about 8 in. by 10 in.; these can be run up on the inside of the walls through the roof and down and under the cars and pipes so as to draw off the cool air and thus cause the warm air at the top to fall and equalize the temperature. It would be better to arrange means of allowing the heated air to be discharged at the top or nearer the top of the kiln by closing up the duct and connecting it with galvanized iron conductors that could be arranged so as to distribute the heat in a progressive manner, that is, spaced gradually further apart towards the receiving end of the chamber.

If the cars go in endwise it would be practical to have a pipe heated with live steam running through your kilns at the receiving end, under the first car, this to be provided with a branch pipe from a T which can have half a dozen small holes to allow the escape of just sufficient steam to keep the air moist at that end of the kiln.

Why should you need to drive your fan at a very high rate? Better get a larger one and run it about 500 or 600 revolutions if your fan is too small.

The use of your exhaust steam may be the best under the circumstances, but a better way might be to have an additional heating coil in connection with your fan for the use of the exhaust steam, as doubtless it is near your engine and the heat loss will be much less.

So far as the writer knows, at least in furniture plants, there are few, if any, blower kilns in use, they having been superseded by the moist air or vapor kiln, as being more economical and better.

The release of live steam into the car of lumber when first placed in the kiln necessitates having a separate chamber at that end of the kiln. This can be done by building a cement wall from the ground up to and flush with the top of the track rails and across the chamber; a heavy canvas or duck curtain on a

roller is dropped down, forming a separate room. The lumber can then be steamed for twenty-four or forty-eight hours, but then unless the heating and ventilating, as the car proceeds through the kiln, is properly adjusted, your lumber stands a good chance of being ruined. Under the circumstances would not advise attempting this with a kiln such as you have. If your kiln, with some improvements suggested, will deliver you enough lumber by the slower process, better be sure than sorry. The tile ventilators spoken of will require hoods on, above the roof, and can have sliding dampers on the end under the kiln cars, so that the ventilation can be regulated, and when once the right degree has been ascertained need no further attention; that is, if your kiln is of a good substantial brick construction.

(Further information relating to this matter will be published in the January issue).

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How to Get Smoother Lumber

Q.—It has always been the custom in our factory to do our ripping with saws having set teeth. Our product has been boxes and packing cases, and the quality of the work has always been good enough, although, of course, we knew that it was not the smoothest work which could be done. It now comes to a question of getting smoother work from our saws, and as we are unable to make the necessary sacrifice in speed to obtain this smoother cutting without seriously interfering with our output and cost, it comes down to a very serious matter, and we would like to get a little more light on the subject. Is there any other form of saw adapted to our requirements? Would it be possible for us to avoid the cost of a new equipment in rip saws, by refitting our present saws in some manner?

A.—Fortunately, your problem is not as serious as it appears on the first consideration, and the solution is to use swedged points on the teeth instead of setting them. As it is easily seen, when a saw is set, one tooth is bent out of line with the saw on one side and the next tooth is bent the same way and distance out of line on the other side, thus securing the required clearance for the blade. Such saws cut fairly well when run slowly, but when crowded, as they must be in a live box factory, they do very rough work and cut hard, besides which the fine pointed teeth rapidly lose their edges and require to be changed often.

A swedged saw, on the contrary, has its cutting points pressed out on each side of each tooth, exactly the same as the teeth of a band saw, thereby presenting to the cut an edge like that of a chisel, which cuts its way freely through the wood with no tendency to tear the grain or leave a rough edge. The swedged saw has the further advantage of allowing each tooth to have its cutting edges perfectly balanced in the cut and allowing each tooth to cut on both sides, giving the same smooth cut as might be expected if the number of teeth in a set saw were doubled, and at the same time retaining the proper cutting angles and roomy throats which experience has demonstrated to be absolutely necessary to secure easy cutting. Circular saw swedges, working on exactly the same principle as the proved and tested band saw swedge, but adapted to the heavier gauges of circular saws, and their shape, may be had at prices which makes it poor business indeed to think of equipping the mill with new saws to obtain better work. If you desire to try this experiment, swedge one of your saws with an ordinary hammer swedge. Make the cutting point as nearly like those used on your band saws as possible, and give it to one of your sawyers to try. He will, without doubt, tell you that it cuts freer and easier, and that it will stay in good condition more than twice as long as the set saw, while the class of work he does with it will be the clinching argument in favor of the swedged circular rip saw.

* * *

Removing Sawdust by Suction

Q.—"It has been suggested to us many times that we ought to make more of an effort to remove the sawdust and shavings from our machinery by the suction system, but heretofore, except in the case of machines that would be positively injured by the accumulation of their cuttings, we have never gone very far in this matter. It has been our contention that the use of fans and suction pipes in addition to being a most expensive item in first cost and upkeep, is also a costly method in winter, when it is necessary to furnish heat for these fans to draw out of the building altogether. So many use these systems extensively, however, that we would like the opinion of your Question Department in this matter."

A.—Waste collection systems employing suction are certainly costly in the first place and require an apparently excessive amount of power for their operation, but the benefits to be derived from their use are so many and so important that once they are properly sensed, all objection to them disappears, and we could not get along without them. In the first place, the original design and erection of these systems must be correct, and it pays well to carefully consider your requirements, present and contemplated, before starting to make the installation. Pipes too small mean insufficient draft and clogging; too large, mean wasted investment and power as long as they operate; consequently, it is necessary for some one who fully understands the business to plan the outfit from the smallest outlet to the final discharge. Oftentimes the addition of a small pipe in the wrong place will cause the draft to fall off and the pipe to clog, whereas had it been added somewhere else, it would have improved the system. Sometimes a fan may be run too fast, eating up power and belts to no good purpose, while reducing the speed to the proper point, sometimes only fifty turns per minute, will produce the same draft with a great reduction in operating expense. In motor-driven installations it is particularly necessary to pay attention to the amount of power required, for it is not easy or economical to change motors and fans after they are once installed. The foregoing difficulties are not mentioned to discourage, but rather to warn a prospective user of the things he must avoid to secure a satisfactory installation, and reap the full measure of those benefits which have been demonstrated to follow.

First, you have a clean mill, and it is clean all the time, and this means a higher standard for your employees, a brighter, healthier place for them to work, which benefits you directly, and also what is even more important, you make your mill safer from fire and a better risk for the insurance man.

Second, you get more and better work from your machines, for it is no longer necessary to stop the work to clear away the chips, neither is it necessary to use so much oil or so much babbitt, or so much

time in keeping machines running, which, if they were kept clean, require comparatively little attention.

Third, you save money in the handling of the waste itself, for once installed, it continues to collect and deposit where you want it, and where it will do the most good, material which otherwise would be dangerous, costly to move and a general nuisance around the plant. It does not take long for savings like these to run into money, and if you will take a pencil and quietly figure what you could afford to pay for an outfit which would do these things, and then go and find out what it will actually cost, you will wake up with a jump and regret that you have never done it before.

Regarding the objection to the withdrawal of heat from the mill, this is pure fallacy, for as you will readily see, most of the openings into such a system are near the floor, and the air they take and carry away is the cold air which collects in layers near the floor, and which when removed must be replaced by warm air from the ceiling, consequently the fans keep the air in proper circulation, keep it fresh, and keep the warm air coming down from the ceiling, as it should do, instead of staying up where it can do no good. In summer, the exact opposite is the case, for a mill containing a good exhauster system is never hot and close, but is always the coolest place a man can find, consequently it promotes bodily comfort and has a very direct bearing on the quality and quantity of your product.

* * *

Keeping Electric Motors Clean

Q.—"Having installed a number of motors, we are, as perhaps might well be imagined, up against the cleaning proposition good and hard. Our motors get dirty pretty quickly, and we find that a brush and hand bellows does not do at all for cleaning. It seems that we have read in your columns some suggestions for the use of compressed air in woodworking plants, and as this is conceded to be the best cleaning medium for electric motors, we write to ask for information concerning the necessary equipment.

A.—There is, as you say, nothing that will keep a motor on the move like compressed air for cleaning, but it has to be applied in a convincing manner or it loses its value. Of course, anyone can clean a motor by removing the rotor and digging the dirt out, but to do it thoroughly requires a jet of air from a 1/16-in. nozzle at about ninety pounds per square inch, and this can only be obtained from a suitable compressor. A sharp fine jet of air penetrates into all the crevices between the coils and sweeps the dirt from between the rotor and the stator of a motor as nothing else will, and it is also true that the same treatment is very good for any machine which collects dust, cleaning it better and quicker than it could be done in any other way. In addition to cleaning the motors and machinery, compressed air finds many uses around a woodworking plant, such as cleaning rafters, blowing dirt from anything, clearing gauges on tools, sweeping chips from work tables, etc., so that if you put in a compressor to clean your motors you will certainly want to use it for other things as well. The Westinghouse Air Brake Compressor makes an ideal outfit for these purposes, in that it operates by steam, is self governing, and requires no skilled attention, besides which it is the cheapest compressor of its capacity on the market. The machine should be installed in the engine room, and the air piped to two or three outlets on each floor, from which it is easy to reach the various machines and motors with one or two lengths of hose. Suitable nozzles and shutoffs should be provided to conserve the supply of air, and if the installation is made in accordance with suggestions which are readily procurable from the Westinghouse Company, it will be a source of lasting satisfaction and economy.

Knife Troubles And How to Overcome Them

Interesting and Varied Answers to the Questions of a Correspondent

Montreal, November 20, 1915

Editor Canadian Woodworker:

We have been having trouble with our knives on a 12-in. moulder. We are running hardwood mostly. The knives when put on new apparently are alright and do good work, but after jointing them two or three times they show up cracks on the face about ½ in. deep, in the centre of the knives where the wear comes. All four knives crack the same.

The bevel on knives when new is 35 degs., but after jointing them the short bevel is 45 degs., and slightly rounding at the edge. This bevel is ⅛ in. long.

Second. We also have trouble with small knives running on hardwood. They are alright when put on, but blue about ⅛ in. deep while using. These are high tempered knives.

Can you give us any information as to where the trouble is and how it can be remedied:

"Reader."

Answer No. 1.—We infer that your correspondent is using thin, high speed knives. The condition he speaks of is often brought about by speed of feed not being in proper ratio to speed of cylinder; that is, feed is too slow, and knives are making too many revolutions in approximately the same place, causing friction which generates heat. General practice recommends 10 to 14 knife marks per inch on hardwood, depending on dryness of stock; the dryer the stock the finer knife marks should be.

On second item same reason would apply, and feed must be increased or speed of cylinder decreased to prevent friction and bluing, which draws temper out of cutting edge.

Answer No. 2.—We suspect the knives referred to are high speed, that is, thin knives 1/8 or 3/16 in. thick, about 2 ins. wide, and made from high speed steel. If this is the case anything is liable to happen.

If he is using laid or plated knives, ⅜ in., would say his trouble was in the grinding. With his high tempered knives great care should be taken in grinding. The emery wheel should have plenty of water. A dry wheel, or a wheel with a little dribble of water on it, will cause cracking. The bevel of the knife should not get warm enough in grinding to burn the back of hand when held on it.

Answer No. 3.—It is rather a difficult matter to diagnose knife trouble unless one is on the job where he can see the conditions under which they are operating, and examine the knives, but we would be inclined

to think the trouble is caused in joining the cutters. Perhaps he is leaving a heel on the jointing bevel which is rubbing on the wood enough to generate heat, which would cause the knives to crack.

Regarding the second part of the letter: If the knives are a good grade of high speed steel they should stand heat which would blue them without drawing the temper; but if they are high tempered crucible knives, they will certainly become soft if heated in this way.

The only suggestion that we can make, with the information at hand, is that he keep the knives sharp, and not joint on the machine too often without taking the knives off and regrinding the long bevel.

Answer No. 4.—Regarding cracking of thin, high speed steel planer knives, trouble may emanate from several causes, one being the use of a grade of steel which has not been properly treated by the manufacturer. Some manufacturers utilize a self-hardening grade of steel just as it is taken from the steel mills, and in the rolling of this material cross strains take place which, under pressure, develop into cracks. A second cause for breakage may be the grinding of the knives with water instead of grinding them dry. Another cause may be excessive pressure or the use of too harsh or too hard an emery wheel in the grinding, thereby heating up the edge of the knives, and if water is applied the contraction of the steel causes cracks which develop when the knives are in use. We recommend for knives of this kind high speed steel which has been hot treated by the manufacturer, the use of a mild emery wheel, light pressure, and the grinding of the knives dry.

Regarding his statement that the knives blue about one-eighth of an inch deep while using, this is not detrimental to the knives and is caused by the friction of the cutting, knives revolving at a high rate of speed, and taking off a very heavy cut.

Answer No. 5.—The first item of 12-in. moulder knives and the complaint would indicate either that they were not cutting properly, due to temper or to grinding shape, or that they are drawing the temper of the knife in grinding. We recommend a straight bevel, as the double bevel is very often the cause of a rub which generates heat and draws the temper while the knife is running. If it is impossible to use a straight bevel, every precaution should be taken to see that the bevel does not drag in service. The fact that knives crack would indicate that the heat was generated in the grinding machine rather than on the head, but we are not at all certain of this, as we have not the knives for examination.

Answer No. 6.—We are led to believe that your customer is a trifle ignorant relative to the proper method of jointing knives. We note his knives are ground on a bevel of 35 degrees, and after jointing them the bevel is 45 degrees and slightly rounding on the edge. We would consider this absolutely ridiculous and very injurious to the knives.

The proper way to joint the knives is straight across the bevel. By that we mean the jointing should not change the bevel from 35 degrees to 45 degrees, but keep it at 35. It is impossible to get a satisfactory cut. He certainly ought to know that if the knives work all right when they come to him, and that after using them a while they are unsatisfactory, that his trouble is entirely in his own plant. In changing the bevel from 35 to 45 degrees instead of getting a nice clean cut, he gets a scrape. This, of course, heats the knife of any high tempered steel that is heated along one edge and not all over uniformly. By that we mean the entire knife. There is set up excessive strains caused by the contraction and expansion of the steel.

Answer No. 7.—We assume that the party is using what we term a high speed steel knife, and we think the trouble is that he is using what we would call an inferior article. Perhaps he may have purchased these knives on the price only; there are many different prices and many different qualities of these knives that are used on the round cylinder for fast work. The knives measure from 1½ to 2 inches in width and are 1/8 or 5/32 thick, and the length, of course, depends on the machine. Some knives that cost twice as much as others are not as expensive when quality is considered. High speed steel must be ground carefully, and it takes almost twice as long to sharpen a high speed steel knife as it does to sharpen an ordinary knife; also, a very free cutting soft wheel must be used. The ordinary type of emery wheel is very likely to be too hard and burn the knife, and if it does the knife will certainly be spoiled. Care must therefore be used in grinding.

The next point that your subscriber refers to is jointing the knife on the machine. This is a practice that is done, but we do not advocate it as a general thing, that is, not too often. It is a better plan to take the knives out of the cylinder and grind them on a grinding machine, in order to get satisfactory work and have the knife hold up. The bevel must be perfectly straight and cannot be round. It is difficult to avoid making a round bevel if you joint too often on the cylinder. We note that these knives blue when being used, and we believe this is caused by running them when too dull, and also they may be a little soft in tempering. One other point to be remembered is that when using the genuine high speed steel knives, they must be ground on an absolutely dry wheel; water will ruin the knife, also a wheel that is sometimes wet and sometimes dry, on account of the moisture that may remain on the wheel.

Knife Grinding Suggestions*

(Loring Coes & Co.)

There are a few things connected with the grinding of paper knives that are greatly overlooked, and some of them are most essential to the best cutting results that can be obtained from any knife.

Taking them in order, the shape of the bevel is an important point. Generally speaking the angle should be about 26 degrees, which is equivalent to a bevel 1¼ in. long on a half-inch knife. Of course, if the knife is thinner the bevel will be shorter, and if the knife is thicker the bevel will be longer. (Measure the bevel on the angle and not on the flat face of the knife.) A concave bevel weakens the cutting edge and should be avoided. If the cutting is very heavy it is sometimes advisable to make a very short second bevel with a hand stone on the knife edge, changing the angle to about 40 degrees for a distance of 1/16 in. This will support the cutting edge and save considerable grinding, but it will increase the difficulty

* Abstracted from pamphlet issued by Loring Coes & Co.

in cutting and should be resorted to only when the paper is extremely hard or where it is gritty.

Starting with the shape of the bevel well in mind we will look at the methods for sharpening and endeavor to explain the best method of using the sharpening wheel. No matter what the material or make of grinding wheel used its face should be sharp, clean and free from any glazed places. It should run in water, at the speed recommended by its makers, and should cut away from the cutting edge. In other words, the motion of the wheel should be toward and not away from the body of the knife. The reason for this is evident as it gives the water applied to the wheel a chance to cool the knife instead of flying off without cooling. If there is a glazed place upon the face of the wheel it will be impossible to grind the knife without spoiling its temper. The glazed place will act as a brake instead of a cutting medium and will generate heat so rapidly that it will be impossible to cool the edge of the knife sufficiently to prevent losing temper. To remove a glazed place, an emery stone or a sharp file corner or emery wheel dresser should be used. If the glazing again appears it is an evidence that the wheel is not of the right quality and is too hard for the work. It should not be used if this fault shows as it will spoil the blade no matter how much care and water is used in the grinding.

The feed should not be too heavy and the depth of cut should be regulated by hand and not automatically. If it is necessary to let the machine run with automatic feed it should be constantly watched and given an extra supply of cooling water; at the same time the operator should watch the extreme edge of the bevel, to see that no temper is drawn by excessive heat due to forcing the grinding.

Remember that it is impossible to prevent drawing the temper if the feed is too heavy, if the wheel is of the wrong grade, or if its face is glazed. The presence of any one of these things will spoil the knife in one grinding, no matter if the contents of a two-inch pipe be put upon the surface of the knife at the grinding point. Also remember that there is no grinding wheel made that will not draw the temper when improperly used, this being a direct contradiction of the advertising put out by some people whose desire seems to be sales rather than satisfaction.

The knife should be hand honed after removing from the grinding machine, using a quick cutting emery stone and kerosene as a lubricant. It is possible at this point to materially assist the cutting of the knife and also to spoil it. The honing should be done carefully toward the edge, not away from it, and no honing should be done upon the flat side of the knife. If a feather edge still remains it can be readily removed with a soft pine stick.

Do not use the grinding wheel after it has been worn so small that the concave of the bevel is noticeable. It is cheaper to buy emery wheels than knives and the concave bevel made by too small a wheel will increase the number of grindings required, will reduce the knife faster in width, and at the same time will give you less perfect cutting on account of the edge being unsupported. Cutting with a concave bevel is equivalent to the use of a razor for whittling. It will cut while sharp, but you can't push on it. Beside these things the concave edge will waver in a heavy lift, sometimes being known to spring 1/32 in. out of true before the cut is completed. This is many times laid to the machine, when the true reason is that the edge is not strong enough to stand the pressure put upon it.

The greatest cause of complaint from knife users who do not do their own grinding, or who own their own machine but believe that their grinder knows all about knives, is the complaint of "nicked" or rough edges. In some seventy years of experience we have found that 98 per cent. of the complaints of this character are due to improper grinding and the balance about evenly divided between unsecure fastenings, too heavy lifts, and flaws in the cutting edge. The so-called "nicking" is generally due to the temper being drawn at the extreme edge of the knife by grinding improperly. It can be cured by grinding off the edge until the softened places have been cut out and then rebeveling the knife. If the foregoing directions have been followed when the knife is rebeveled there will be no further trouble. On the other hand, these two processes improperly carried out will in all probability leave the knife in the same poor condition.

Every knife should be kept, when not on the machine, on a board with a cover for the edge. Be sure that no metal can strike the cutting edge, and see that the knife is firmly attached to the board by a stove bolt with a nut on it. A wood screw is dangerous, as it will work loose and you are liable to accidents if the knife slips. Keep your knife greased, when not in service, with "Three in One" oil. Use nothing thicker. This oil can be readily removed with a piece of tissue paper and will not stain after the first cut has been taken.

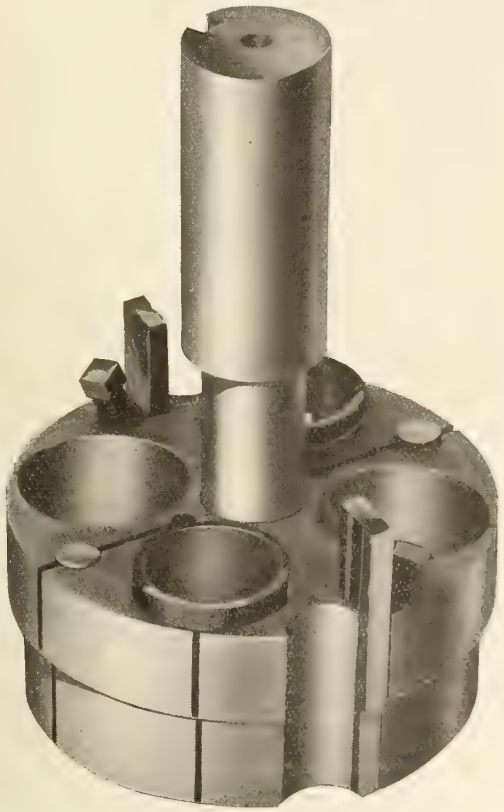
The grinding of metal shears and other square edge knives is just as delicate a matter as the grinding of paper knives, although the work required of the knife may be much rougher. The chief reason for spoiling knives of this class (metal shears and other square edge knives) is the idea that because there is no thin edge to be taken care of there is no danger in forcing the grinding, while in reality the sharp edge is just as sensitive to overheat or careless handling as is the thinner edge of the beveled knife. No metal shear should be ground dry and every caution we have written above against the glazed wheel should be remembered in grinding this class of work.

It often occurs that knives that are used in a machine are attached by machine screws to the cutting head, and in many cases the holes in the knife are threaded. Owing to the thread in a new knife being smaller than the worn thread in the old knife, machine operators often overlook this difference and claim that the knife is not properly fitted. The best way to test correct fit is to attach the knife loosely at first, entering all the bolts into their proper holes. When this is done begin to tighten the blades at the centre, working alternately toward the ends and taking up each bolt about the same amount until the knife reaches its bearing, when all the bolts should be tightened carefully and as nearly as possible to the same tension. It often occurs that a knife will be tightened at one end by a careless operator and will apparently not fit in any other hole, when if it was properly attached there would be no difficulty in entering and tightening all the bolts.

As a last caution, remember that every time a knife is ground its life has been reduced, and be sure that you put nothing against the cutting edge that it is not intended to cut. Handle the knife with the edge up and by the back only. Never reach across the cutting edge for any purpose, no matter whether your machine is protected by a safety device or not.

Boring Tools for Shell Boxes

Illustrated herewith is a bridge block reamer for boring bridgings in shell boxes, designed and manufactured by Messrs. Knechtel Bros., Limited, Southampton, Ont. This tool is especially adapted for a double spindle boring machine. It is fast and accurate and is



"Knechtel" Bridge Block Reamer

now producing an output of 700 four-hole blocks per ten hours. The cutter is arranged so that all cutting points can be ground, and the bits are tempered to stand the heavy strain. The tool is so designed that bits can be instantly replaced. With this bit it is necessary to first band saw the stock, but this is really a saving in time on account of the greater output of reaming. Messrs. Knechtel Bros. also manufacture a full line of boring tools.

Full Line of Shell Box Machinery

The Canada Machinery Corporation, Galt, Ont., have gone extensively into the manufacture of special machinery for ammunition boxes. When the war broke out their regular line included many machines which are used in the manufacture of shell boxes, among which may be mentioned dado machines, dovetailers, boxboard matchers, cut-off saws, disc and drum sanders, and other machines used in the regular manufacture of boxes. In addition to their regular line of machines, they have designed a great variety of boring machines, including an 18 spindle boring machine for the wood screws of the fixed ammunition boxes, a 6 spindle boring machine for the lids of above boxes, and a five spindle boring head for drilling the five holes in handle cleats, which can be applied to any regular borer. A special feature of this machine is that every spindle is fitted with a collar socket which performs a triple duty, in that it takes the thrust of the drill required, and is so designed as to take up all wear. Another important feature is that, should it be required to use different sizes of drills on this machine, a socket can be made to accommodate the various sizes.

A very convenient machine is their three spindle borer, to bore 3 7/16 in. holes in six-hole trays, which bores three holes in one operation, also their five-spindle machine to countersink five 3 7/16 in. holes in the bottom of the box that is designed to carry 25 cartridge cases. The bottom of this box has five rows of countersink holes, five in a row, making twenty-five holes in all. This machine drills five holes at a time, and the table of the machine has a series of stops to space the five rows of holes exactly as wanted.

One of the latest additions is a boring head to bore two 1⅜ in. holes and two ⅞ in. holes in the 4.5 shell box. Their special two-spindle boring machine for boring 3.3, 3.75 and similar holes in the 2.25 centre bridges for fixed ammunition boxes has been improved on from time to time.

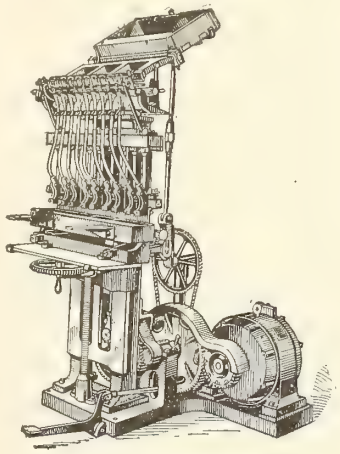
A power screw driver for driving the screws in the various boxes is another of their recent machines. This is a simple, convenient machine, designed to attach to a post, and has a capacity of 1,000 screws per hour.

Situated as their Hespeler shop is, in the midst of a district where shell box manufacturing has been carried on successfully, the Canada Machinery Corporation are in a position to keep up to and ahead of the wants of the trade.

Box Nailing Machines

On another page in this issue appears an advertisement of the Estate of William S. Doig, manufacturers of box nailing machines and machines for driving corrugated fasteners used in the box making industry.

One of the most interesting exhibits in the Machinery Palace at the Panama Pacific International Exposition, which has just closed in San Francisco, was an exhibit of six box nailing machines and two machines for driving corrugated fasteners, demonstrating daily to thousands of visitors how boxes in large quantities could be made in the most economical way by

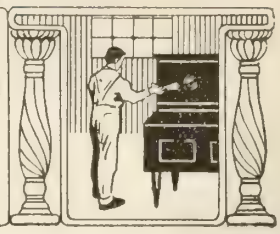


"Doig" Box Nailing Machine

using Doig nailing machines. A Gold Medal was awarded to the Estate of William S. Doig in June for this exhibit, which was subsequently raised by the Superior Jury to a Medal of Honor.

If interested in box nailing machinery write to the Estate of Wm. S. Doig, 54 Franklin Street, Brooklyn, N. Y., for one of their catalogues.

THE FINISHING ROOM



Effect of Different Speeds of Feed on Sanding Capacity

By Leo Forrester

My job is sander foreman for a sash and door factory. Now I read what trade papers come my way, but I never see much written about the 3-speed device on the roll-feed type of sanders we use. As I've found this feed control as useful as any feature on these machines in saving time and keeping costs down, I'd like to tell what it's done for us.

It is not often a plant runs only stock that requires the same finish, and right here's where the use of the three speeds comes in. With this the sanders can be instantly set to the work at hand.

Take the sash and door business, about half the work may be finished at pretty fast speeds, while the other part only has to be carefully sanded at the slower speeds. Now on doors or panels the speed depends on whether one or two cuts are taken and on the grade of material sanded. Third or fourth class doors are usually knotty, and are only painted, so that a high grade finish is not necessary and fast feeds can be used. Only first or second class doors or panels are given a high finish at slow feed. Then again the kind of wood has a lot to do with the speed of feed, because grit cannot cut some woods as fast as others.

A change-speed device is no good unless it's handy and simple. The men won't use it if it isn't. I've always noticed that where operators have to make the usual lot of gear or pulley changes to change the feed, that everything is sanded at one speed. You can't blame them either, as most plants use several different woods, each requiring a different finish. The delay caused by such a lot of gear or pulley changes would more than offset any saving gained by increased speed.

As it is, on our machines, the men actually will sand their work at proper speeds. That's because they only have to drop a handy lever from one notch to another to set the speed of feed to the finish wanted. In this way stock is never held up, and, on the whole, this has saved us a third of our old sanding time and cost, as the work is done in about two-thirds the time it used to take.

Other machines have a lot to do with sanding feed rates. And this is a point well worth looking into when sanding expense is getting too high or the machines are falling behind their true capacity. Poor planing or sawing has set back the capacity of my sanders, at times, fully 50 per cent. That's because the work comes to me rough, and I've had to run it at slow feeds, when it should go through half again as fast. This often is the case with doors, when the stiles and rails stick up too high. You can't take heavy cuts and sand fast. Your grit has to take its extra heavy cut at a slow feed on marked and uneven stock. Besides the cost of this delay, the paper soon wears out and adds to the unnecessary expense. Where the stock is so rough as to require two cuts the cost of sanding is even doubled. You can't slight the work on one machine without increasing the work required of another machine.

When stock comes to the sanders in good shape the speed of feed is set according to the kind of wood and the finish required. Generally speaking, soft woods, as poplar, basswood and cottonwood, can be sanded to the same finish much faster than hard woods. The fastest feeds should be used in boxboard work; insides of drawers and all other inside panels, and any other work that does not require a very high finish.

Polishing work is an exception, because a fine finish can be had at fast feeds, as only a very light cut is required. For this reason light cuts don't cost much as they are usually fast cuts, and the wear on the machine and paper is small. The lighter the cut the lighter the paper expense.

After I got my men used to the right speeds to run their different work, I noticed a jump in capacity about a third over what we had been getting. So I trace a big part of the success of our roll-feed sander work to their ready change of feed.

How to Remedy Some Varnish Troubles

By M. A. Burt

Much has been said about fine checks due to ruptured veneer, and usually the buyer or veneer room foreman is the one who gets blamed for these fine checks. It is true that veneer with the fibre broken and loose, like scales, will check, and is expensive veneer to buy. There is another reason, however, for hair-line checks on veneered or solid finished goods. Most of us have observed minute hair lines on highly polished furniture. This hair-lining is the first stage in the cracking of the varnish, and as the cracks widen the surface takes on a resemblance to alligator leather. This cracking of varnishes is caused primarily by too little oil being used in the varnish. The lack of oil allows the varnish to dry in a short time, but the coating is brittle and soon hair-lines, and these lines in time widen into unsightly cracks. Excess of cheap resins often causes these defects to appear in varnished surfaces.

A few more common varnish troubles are: blooming, crawling, pitting, sagging, wrinkling, blistering, specking, flaking and sweating. Blooming may be remedied by rubbing the surface with a piece of waste, first dipped into water, then into crude oil. Crawling, pitting, cracking, sagging, wrinkling and blistering, necessitate sandpapering or removing the old finish and re-varnishing, as necessary. Flattening can be required by applying another coat of varnish, providing the undercoats are sufficiently dry. Checking, specking and flaking require the removal of the old finish and re-varnishing. Sweating can be overcome by re-rubbing, unless a varnish that will never dry hard was used, when re-finishing over the old finish with a hard drying varnish, which may be rubbed to a dull finish, will be necessary.

There are many elements that affect the uniformity of varnish, and among these are the atmospheric con-

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3	Quartered Oak	2s.	60 x 30 x 3/8—5 ply	57	Birch	2s.	60 x 30 x 3/8—5 ply
184	Quartered Oak	1s.	60 x 30 x 3/8—5 ply	43	Quartered Oak	1s.	72 x 24 x 1/4—3 ply
47	Quartered Oak	1s.	60 x 24 x 3/8—5 ply	17	Mahogany	1s.	72 x 24 x 1/4—3 ply
17	Quartered Oak	2s.	60 x 20 x 3/8—5 ply	27	Mahogany	1s.	60 x 30 x 1/4—3 ply
111	Quartered Oak	1s.	60 x 20 x 3/8—5 ply	19	Quartered Oak	2s.	60 x 30 x 3/16—3 ply
1	Mahogany	1s.	60 x 20 x 3/8—5 ply	9	Plain Oak	2s.	60 x 30 x 3/16—3 ply
31	Quartered Oak	1s.	60 x 18 x 3/8—5 ply	20	Plain Oak	1s.	60 x 30 x 3/16—3 ply
11	Quartered Oak	1s.	48 x 18 x 3/8—5 ply		Birch	1s.	
41	Quartered Oak	1s.	60 x 30 x 3/8—5 ply	19	Birch	2s.	60 x 30 x 3/16—3 ply
	Plain Oak	1s.		330	Maple		48 x 48 x 3/16—3 ply
44	Plain Oak	2s.	72 x 24 x 3/8—5 ply	24	Maple		42 x 42 x 3/16—3 ply
14	Plain Oak	2s.	60 x 30 x 3/8—5 ply	135	Maple		36 x 36 x 3/16—3 ply

October 30th, 1915

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Chapter 2—*Manufacture of Glue*
Chapter 3—*Testing and Grading*
Chapter 4—*Methods in the Glue Room*
Chapter 5—*Glue Room Equipment*
Chapter 6—*Selection of Glue*

WOODWORKER PUBLISHING CO., LIMITED

345 Adelaide St. West, Toronto

ditions at the time the varnish is applied. More complaints of the non-uniformity are received during the spring and fall than at any other time. These are the transition periods from cold to warm and from warm to cold weather. Much more difficulty also is experienced during the summer than winter. Artificial heat is much more easily regulated and controlled, and conditions can be made uniform. The reason for the difficulties experienced in spring and fall is that varnish must have an even temperature during the time it is hardening, and if it becomes chilled after it has been applied, the drying is usually very unsatisfactory. Artificial heat usually is not kept on continuously at this time of the year, but if it is windows are opened on warm days, and a draft is produced. Difficulties are experienced with varnish blooming at this time, on account of these drafts. It is almost always a rule that the higher the quality of varnish, the more apt it is to be sensitive to conditions of this kind.

It frequently happens that work that has stood in a cold room is brought into the finishing room and is varnished before it has an opportunity to warm. The result is that varnish chills after it has been applied and the drying is retarded, and later on cracking of the varnish will result. This is especially true of varnishes that are short in oil. Brush marks in varnish are frequently seen on finished work. They add a great deal of labor to cutting down for the succeeding coat, and, when very deep, necessitate an extra coat of varnish. One of the greatest essentials to avoid brush marks in varnishing is for the workman to know exactly how much brushing the varnish will bear before setting. Varnishes that are quick setting must be laid on freely, be leveled and then allowed to flow out. Varnish that has been worked until it pulls on the brush cannot flow out. When working on large panels it will be necessary to "mass" the varnish on more than it would be safe to level, in order to allow time to manipulate and connect the varnish without showing laps. The surplus should be taken off as soon as full connections have been made, as it has then served its purpose.

One mistaken idea so many buyers of varnish have is that cheap varnish is economical. Varnish should not be figured by the gallon, but by the job, the price per gallon plus the cost of varnishing. Low price varnish puts one to several extra expenses on the varnish room. More labor and time are required in putting it on. More gallons must be paid for, because it covers less surface. It causes trouble and delay, and the frequent doing over of single pieces or the entire lot. Unfortunately, many manufacturers simply estimate the cost of varnishing, and are of the opinion that, after all, the cost of varnishing per square foot is so small that it is only a waste of time to bother about determining it.

Canada's Financial Resources

The Canadian Government asked for subscriptions to a loan of fifty millions. More than one hundred millions were subscribed. There is no evidence, either, that the financial resources of the Dominion have been more than merely "scratched."

This is one of our Rotary Mills for making cross-banding, panels, drawer bottoms, center stock, back panels, etc.

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THE EVANSVILLE VENEER CO.

Evansville, Indiana

Veneers and Panels

The Importance of Veneers and Built-up Stock

By Albert Hudson

There is no question that the use of veneers and built-up stock and panels is greater to-day than ever before, and that new avenues are constantly being opened out for their use. The idea that veneers, and goods manufactured of veneers, are inferior, has been superseded by the knowledge that for quality, beauty and utility, veneers cannot be beaten, surpassing the product produced from solid material.

The question might be asked why veneering should be used more than solid stock. The reason in part is that solid stock made up into furniture with dowels, glue joints, etc., would never stand the test of time, for the following reasons:

All woods are subject to atmospheric changes, such as heat, cold and moisture variations, which, of course, cause contraction and expansion; also, all solid woods have a tendency to take up moisture, and then dry out again, which eventually causes the glue joints to open out and the dowels to come loose; the result being the falling apart of that particular piece of furniture. This is not so with built-up stock goods, made in three, five and seven ply, each being so crossed and laid contrawise to the ply next to it that there are no joints to shrink or come open. Herein lies one of the advantages of built-up stock. For example, each top, panel, or gable going into the veneered product is glued up with different and separate plies of wood, each ply of which is laid at right angles to the one next to it.

In veneering a five-ply top for a buffet, say, 48 in. long by 24 in. wide, a piece of veneer 49 in. long by 25 in. wide is first laid lengthwise, then the cross-banding or veneer 49 in. long and 25 in. wide is laid upon this, covered with glue both sides, then the core or centre 49 in. long and 25 in. wide is laid upon the cross veneer; on the core is laid another cross veneer 49 in. long by 25 in. wide, covered with glue both sides, and then is laid the last or face veneer with the grain running the 49 in. way. This is then put under pressure and remains there until the glue has thoroughly set. This process makes the entire five plies as one solid piece of material except that the cross-plies make it absolutely impossible to split the top even if an axe was taken; the same is true with the three ply drawer bottom or panels. Each ply being laid contrawise to the next one to it makes a strong reinforced lamination with much more strength and resistance against splitting, warping or twisting than solid wood.

To-day the veneer trade practically monopolizes the drawer bottom business. The writer believes that built-up stock would be advantageous in many ways in the use of drawer sides and backs. How often one inspects an article of furniture and finds that, while the outside appearance is all that can be desired, yet on close inspection of the inside there is room for improvement, especially in the drawer sides and backs, which are often ragged and rough or chipped, thus deteriorating the quality of the finished product. There are box factories to-day making box sides of two ply gum and sycamore, and the results are satisfactory.

Makers of built-up stock should give careful attention to the possibilities of increasing the use of two and three ply stock for drawer sides and backs, etc. If made of built-up stock they would be easily worked and would give a fine clean finish to the drawer.

Face Veneers

There are many problems in the selection of face veneers. Sometimes the question is asked, Why is it that sliced oak, or rotary cut, has a right and wrong side and may not be used with the wrong side up, while such woods as mahogany, walnut, etc., are often reversed in the process of matching up in figures? Again, why is it that in reversing and matching up quartered oak it is necessary to have sawed stock instead of cut stock, when in matching mahogany, walnut, etc., it may be done from cut stock?

Quartered oak has a series of peculiar hard fibres running through it which make the splash line figure, these being so hard that no cutting knife will split them continuously; the knife either digs below or above them in the cutting process. The result is that the grain is slightly ruptured and uneven, and in the final drying out this hard film making the splash line shows flakes somewhat like raised grain.

Undoubtedly there are improvements being made along this line of cutting veneers, but the time has not yet come when sliced oak can be produced as fine as sawed oak or when it can be reversed in matching up figures and give the same satisfaction.

Another reason why the practice is not followed with mahogany, walnut, etc., is because these woods have not the hard film of the quartered oak, therefore cutting better. However, there is some disturbance of the fibres in cutting, but they are more easily worked than the quartered oak. There is some sawed mahogany, walnut and gum in fairly figured stock, but the extra fine quality in these woods is seldom sawed. The main reason is that over half the finely figured wood would go into the sawdust pile even with the very best of saws, and wood of this character is too valuable to use in such a manner. There is no doubt that sawing is the best process of working veneer, and yet the very finest of veneers and the most valuable face veneers are nearly always cut stock.

Experience in Buying Veneers

In the selection of face veneers the widest range of values is undoubtedly found in mahogany, and it is right here that it takes experience to teach a man values. Without experience it is difficult in selecting face veneer to know whether or not he is getting his

money's worth. The first consideration in the purchase of veneer should be to get the very best stock for the work in hand.

In plain mahogany there are varied figures with enough frequency to be practically standardized. These have a fairly well fixed value, though aside from these the selection of mahogany and the establishing of the values call for experience in judging figures and their possible appreciation by the public after being finished.

There are three methods in general use for producing face veneer—sawing, slicing, and rotary cutting or peeling the sheets from the logs as they revolve in the veneer lathe. The bulk of rotary cut stock is used principally for backs, fillers, plain panels, and in the packing trade. There is quite a lot, however, which enters the face veneer business.

Woods that are best manufactured into the veneer by the rotary process are yellow pine and bird's-eye maple. Quite a lot of mahogany is cut on the rotary machine, especially what is called plain mahogany. Gum wood and birch are also extensively used for the rotary face stock. Oak often shows figure of excellent beauty from certain blocks in the rotary cutting.

It is well for the buyer of face stock to make a close study of the different cuts in the veneers to understand their relative values as well as their relative cost, also to keep the different methods of cutting in mind and make it a point to stop and analyze matters now and then so as not to become confused on the different relative values of the different veneers, because these are not always based upon the method of cutting.

(To be Continued in January issue)

The Sanding of Veneers

(Staff Article)

Because nearly all veneer work is sanded the sanding operation plays an important part. The veneer used for outside face is usually sanded and scraped with the view to getting the highest quality of finish. Some of this work is done by panel manufacturers and veneer users everywhere. They, perhaps, more than any other class of wood users, are interested in good sanding. Now, good sanding, in a broad use of the term, does not mean simply getting the best finish on the wood and bringing it to what one may regard as a correct surface, though this, of course, is an important and even an essential factor. There is another factor, and that is, doing the work in the most up-to-date manner at the lowest practical cost. The cost is an important item in sanding, especially where the work is carried on to the finer points of preparing stock for finish, and it is not unusual to find that between two people who have the same degree of correctness as to the finish of their work there is considerable difference in the cost to obtain this. Those who get the lower cost are usually the ones who have studied carefully and followed closely the modern appliances for this work, so that they can get the work done in the quickest time and with the least possible expense, considering the quality.

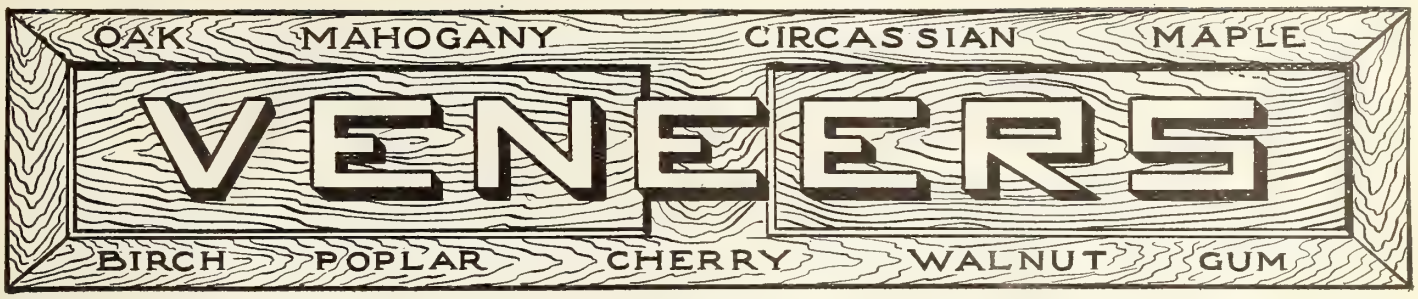
It used to be that practically all sanding involving quantities of stock was a matter of running the flat stock through roll feed drum sanders and doing some work on the old arm sander and special disk sanders. Then there came the belt sander to assist in this, and then the makers of sanders invented the endless bed feeds to take care of short stock better, and following these came the hopper feed arrangement. The makers and users of veneered panels are, perhaps, more interested in these hopper feeds than anyone else. A man making doors and sanding long lengths of lumber does not care so much for these things, because it is easy enough to feed the stock consisting of larger units, but when it comes to panels, which are of comparatively small size, and are often made in large quantities for each size, the hopper feed proves of much convenience and should materially assist in increasing the quantity of the work done, and thus reduce the cost.

Another important factor in good sanding is that veneered work requires some special attention as compared to solid work. It will not stand the heavy, rough manipulation of older times, because, when the work of the sander is heavy enough to generate heat, it may loosen the glue under the face veneer and cause trouble, and when the face veneer is thin, heavy or careless sanding may result in cutting through the face in spots and thus spoil the work. Therefore, light, delicate sanding is often necessary, and it is always desirable. This calls for very careful adjustment and a series of light cuts instead of a few heavy ones. At times it also calls for the belt sander, with its convenience for shaping the direction of the cut, as well as controlling the pressure. Indeed, the belt sander for finishing off has come to be a very important machine in sanding cabinet work, and seems to fit in especially well where the cabinet work is faced with veneer.

Thus we have involved in correct sanding not only the matter of the right kind of ultimate result in finishing, but also an interesting study of the different ways and means that may be resorted to to get the correct thing in finish and maintain it with reasonable positiveness, while, at the same time, keeping in mind the fact that the item of cost also enters as an element worthy of consideration. The way to reduce cost of sanding operations is not by slighting the work nor by trying to make one machine or one operation do it all, but by a combination of machines and methods that will insure the best kind of finish with the lowest practical expense for operation. So some may arrive at this through one process or series of machines and some through another, because both the conditions and the work vary. The best way to know whether you are doing your sanding correctly is to make a study of all the machines and devices offered for this work, compare them with what you are using, and from this make your deductions, and also your conclusions as to whether you need some new machine or not, and, if so, what machine.

Dominion Mahogany & Veneer Company Open Toronto Branch

Robert Bury & Company, lumber and mahogany dealers, 79 Spadina Avenue, Toronto, have been appointed selling agents in Western Ontario for the Dominion Mahogany & Veneer Company, Limited, of Montreal. The office of the latter company will be located in the office of Robert Bury & Company, with their warehouse at 134 Richmond Street West, where they will carry in stock all classes of sliced and sawn mahogany, rotary cut hardwoods and other lines. Both the Dominion Mahogany & Veneer Company and Robert Bury & Company are well known to the readers of this paper. The latter firm is the Canadian branch of Robert Bury & Company, England, Limited, of Bootle, Liverpool, who are specialists in all high grade hardwoods for the piano, furniture and woodworking trades.



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VENEERS

Red and White Oak, Birch, Poplar, Gum, Yellow Pine, Cypress, Etc.

PANELS

Three and Five Ply—All Woods.

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LARGE STOCKS FOR QUICK SHIPMENTS

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GRAND RAPIDS, MICH.

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Reg U S Pat Off. Reg U S Pat Off.

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Manufacturers of

VENEERS and LUMBER

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ANY THICKNESS,

1/24 and 1/30 Slice Cut

(Dried flat with Smith Roller Dryer)

1/20 and thicker Sawed Veneers, Band Sawn Lumber.

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Indiana Quartered Oak

Reg U.S. Pat. Off. Reg U.S. Pat. Off.

Buyers of Veneers and Panels

will find it to their advantage to purchase from the manufacturers and dealers whose advertisements appear in the "Canadian Woodworker." They are progressive firms—the leaders in the business, which is a guarantee of good service and prompt attention to orders.

Give your business to the man who will spend his time and money to get in touch with you. He deserves it—if his stock and prices are right.

Handling Veneers and Lumber

After four years as manager of the Dominion Mahogany and Veneer Company, Limited, Montreal West, Mr. Geo. Kersley has started in business for himself as a dealer in veneers and wholesale lumber merchant. His office is in the Bank of Ottawa Building, St. James Street, Montreal. Mr. Kersley has had a very wide experience in the veneer and lumber business in Canada and the United States, being engaged with some of the leading plants. Prior to locating in Montreal, he was the representative in the Eastern States and Canada for the Rice Veneer Lumber Company, of Grand Rapids and New York. It will be seen that Mr. Kersley is something more than a salesman of veneers—he has had the practical experience which counts for so much in conducting a business of this character.

Mr. George Kersley.

At the present time he buys his logs in the south and has them cut into veneers in New York; a little later he will acquire a Canadian plant. Mr. Kersley handles sawed and sliced veneers in mahogany, oak, ash, koko, vermillion, English oak, and marqueterie inlays; in lumber he deals in mahogany, teak, poplar and oak.

Mr. Kersley has given special attention to lumber for making shell boxes, and carries a large stock of suitable spruce and birch. He also represents a large firm making bridges and ends for the 18-pounder and 4.5 boxes.

Making mahogany brown is a notion that it is hard to find logic for. Why not use walnut or gum?

A bulletin on basket willow culture just issued by the U. S. Forest Service is opportune in view of the demand likely to be made upon American growers because of the greatly reduced imports from Europe. The growing of basket willow in the United States has already reached fairly large proportions, and it may be expected to increase in view of the stimulated demand. The willow is used by furniture makers, basket manufacturers, and for numerous other purposes.

Shell Box Lumber

Bridges and Ends

In addition to an immense supply of shell box lumber I have the equipment to make immediate shipments of shell box parts—especially bridges and ends.

I also make high class sawed and sliced veneers in mahogany, koko, vermillion, oak, walnut, etc.

Foreign and Domestic Lumber.

My quotations will interest you.

GEORGE KERSLEY

224 St. James Street **MONTREAL**

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

PENROD WALNUT & VENEER CO.

Manufacturers

Exclusively Walnut Lumber and Veneers

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Manufacturers of

Hardwood Lumber and Veneers

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Veneer Mills HELENA, ARK.

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Poplar

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Highest Grade — Right Prices

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The Glue Book

What It Contains:

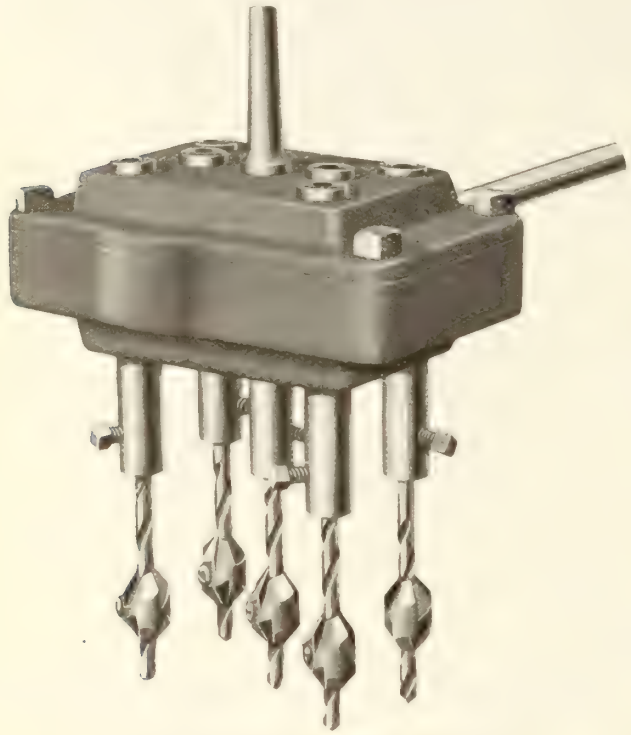
Chapter 1—Historical Notes
Chapter 2—Manufacture of Glue
Chapter 3—Testing and Grading
Chapter 4—Methods in the Glue Room
Chapter 5—Glue Room Equipment
Chapter 6—Selection of Glue

Price 50 Cents

Woodworker Publishing Co.
Limited
345 Adelaide St. West, Toronto

Five Spindle Boring Head

A short cut in the manufacture of shell boxes is brought about by the use of the five-spindle boring head illustrated herewith and manufactured by Jackson, Cochrane & Company, of Berlin, Ont. This head is designed for boring and countersinking the holes in the handle cleats of ammunition boxes in one operation. The spindles are of steel and are operated by steel gears, which are inside of the cast-iron case. This head can be fitted on either a vertical or horizontal boring machine and has a capacity of 15 cleats per minute.



Five Spindle Boring Head - Jackson, Cachrane & Co.

The Linderman Dovetailer

Ammunition cases of all kinds require wide lumber. For ends and sides it is particularly necessary to use wide stock, and to afford relief from the high cost of these widths of stock, the uniting or joining together of good narrow stock is advisable. Ordinarily two important obstacles stand in the way of this practice—one of which is the cost of joining narrow lumber in a workmanlike manner; and the other difficulty is the quality of any feasible method. It is common knowledge that ten and twelve inch No. 2 common lumber is $4.00 to $6.00 higher in price than four and six inch widths, but furniture methods of jointing lumber are so expensive that the difference in price is absorbed by the cost, while the box makers' methods of jointing and gluing are too unsightly and weak to be permitted at all.

Boxes made for the Bethlehem Steel Company shell department are either made of wide one-piece stock, or from narrower lumber "welded" together with taper contact joint in glue, made automatically at eighty to one hundred feet per minute, and yet of a quality which does not impair either appearance or strength.

It seems that no more striking instance of mechanical assistance has appeared than an aid in raising narrow lumber value at a time when shell boxes of quality are in demand. The Canadian Linderman Company, Limited, of Woodstock, Ont., have supplied the Linderman dovetail jointing machines for shell box trade, and concerns using the machines in normal times have found them to be a valuable assistance in broadening their lumber market and supply.

The Linderman shops report heavy demand for their machines, and a night and day shift is required.

Specialties for Shell Boxes

The Radcliff Saw Manufacturing Company, Limited, of Toronto, have recently put on the market several specialties for shell boxes. One of these is their Beaver dado head, which is used for cutting the grooves in the sides of the shell boxes, also for cutting the slots in end pieces of shrapnel boxes. These dado cutters will cut much faster than the solid head dado using knives, and in one plant a machine rigged with Beaver dados cut 9,000 box sides per day, as against 1,500 sides done on machines with solid head dados. In each piece grooved as referred to above there were five grooves cut across the grain at one operation, the grooves varying in width from 1⅜ in. to 2⅝ in. to accommodate the bridges used to carry the live shells. Of special interest is the small cylinder saw shown in the centre of the illustration accompanying this article. This saw is made of best Swedish bandsaw steel and is only 19 gauge thick. It is fitted to a solid steel head with shank made to fit any drill or boring machine chuck. In the centre of this saw is a coil or spiral spring which ejects the core immediately the saw teeth cut through. This saw can be spring set for clearance and is already in use in a number of factories manufacturing shell boxes, for cutting the holes in the top and bottom trays of the boxes. The simplicity of this cylinder saw, its labor-saving features and low price, make it a desirable addition to any woodworking plant's equipment for the manufacture of shell boxes. Besides these two specialties the company are also manufacturing special round-faced groover saws for cutting the groove in handle cleat for shell boxes, as well as a full line of planer saws. These planer saws are hollow ground so as to run without set and will cut either with or across the grain. The work is done so smoothly that there is no need of sanding whatever.

Radcliff Shell Box Specialties

A subscriber to the Canadian Woodworker in Massachusetts wants to get in touch with Canadian manufacturers of hardwood dowels who also have threading machines for putting threads on the dowels. Any person interested may obtain the name from the Editor of this journal.

Robert Bury & Co.

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Shell Box Lumber For Sale

1 Car 1 x 9″ Spruce
2 Cars 3″ Hard Maple
1 Car 1½″ Hard Maple
2 Cars 1 x 8¼″ and up Hard Maple
2 Cars 1″ x 4″ to 8″ Birch
1 Car 3″ Birch
2 Cars 1 x 8¼″ and up Birch
2 Cars 1½″ Beech

Dimension Stock a Specialty

Mail us enquiries for anything in Hardwood. Low prices and prompt despatch.

We are Selling Agents in Western Ontario for

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In our warehouse, 134 Richmond Street W., Toronto, we stock the following:—

SLICED Mahogany, African and Mexican, Walnut and Qtd. White Oak.

SAWN Mahogany, Cuban, Mexican and African, Qtd. White Oak.

ROTARY CUT Birch, Poplar, Ash, Maple and Gum.

We stock in our yard, foot Spadina Avenue, Toronto,

1″ to 3″ African Mahogany, All Grades
1″ to 3″ Honduras " " "
1″ and 2″ Shorts " " "
1″, 1¼″, 1½″ and 2″ Black Walnut, 1sts and 2nds

Mr. Western Ontario Buyer, when you are in Toronto, please give us a call

MADE IN CANADA VENEERS. WHY BUY FOREIGN?

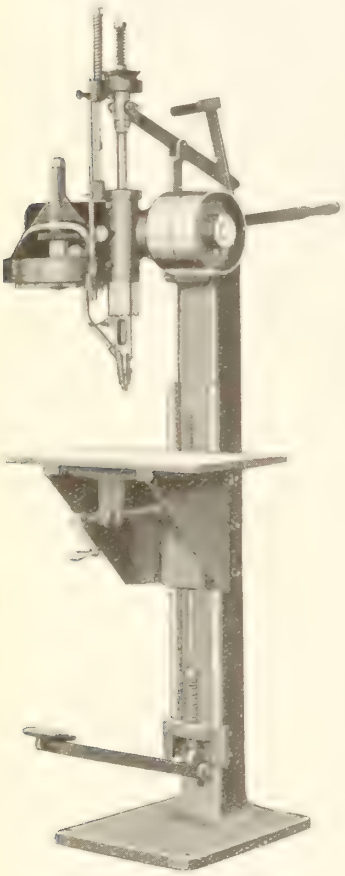
Dominion Mahogany & Veneer Co., Ltd.

Head Office and Veneer Mill
MONTREAL W., QUE.

79 Spadina Avenue, Toronto

Economy of Screw-Driving Machines

One of the principal and probably the most laborious operations on shell boxes is the driving of the various screws used in assembly. It is required that the screws shall be so set as to exert the maximum holding power, which prohibits boring of screw holes large enough to allow the screws to be easily driven. It is, therefore, a very slow, costly operation when done by hand; in fact, we have been told by shell box makers that the excessive cost of this operation when done by hand turns a possible profit, at the prices allowed, into a positive loss, and that the only possible method of doing this work profitably is by the use of screw-driving machines. A complete line of automatic screw-driving machines of superior design is manufactured by the Reynolds Pattern & Machine Company, of Moline, Ill. They advise us that shell box manufacturers in Canada and the States are installing these machines as rapidly as they produce them. Their No. 2 standard type is illustrated herewith. It is particularly suited for placing the screws in the straps of shrapnel boxes, screwing on bottoms, cleats, etc. It may be fitted to drive, without change or adjustment, any three consecutive sizes, flat or round head, or two sizes filister head, No. 6 to 14 inclusive, wood or machine screws, or three sizes machine screws up to No. 20. All the above up to 1½ inches long if smaller than No. 10, or up to 1¾ inches long, No. 10 or larger. It can be fitted with boring attachment if desired.



No. 2 Standard Type Automatic Screw-Driving Machine.

Reynolds screw-driving machines are very simple and rapid in operation. Screws are thrown into a hopper and require no further attention. The work is placed on the table and handled exactly as if boring were to be done instead of screw setting. When the work is in position, depressing the foot lever brings down the spindle, driving the screw home, at which point their patented spindle construction allows the bit to stop, preventing the over-running of screws or marring of screw heads or work.

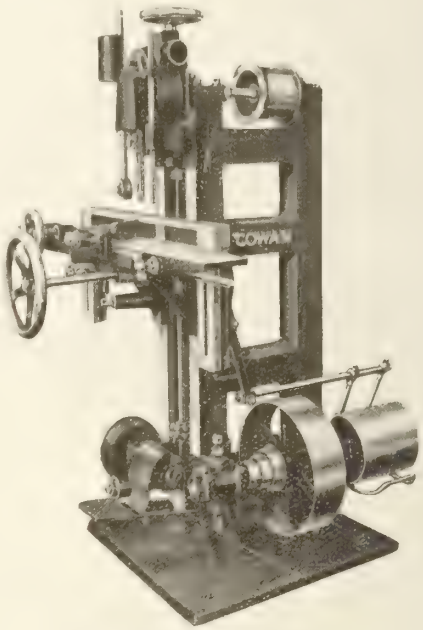
As the spindle runs from 800 to 1200 r.p.m., screws are set practically instantly, and the only limit on quantity of work done is in the ability of the operator to get the work in place. In general it may be safely assumed that screws could be set as rapidly as holes could be bored.

Machines are made with boring attachment also, when it is desired to do boring and screw-driving on the same machine. This is not, however, usually the case on shell box work. They are made in different sizes and styles for different operations, or a single machine can be arranged for all of the screw-driving where the volume of work being done is not great.

The Reynolds Company ask our readers to send them a sketch of the boxes they are making, showing location and sizes of screws and number of boxes desired to be screwed up per day, and to allow them to submit a proposition for machines suitable for their work and an estimate of the expected saving in operation, over hand work.

Woodworking Machinery Exclusively

For the last fifteen years Messrs. Cowan & Company, of Galt, Limited, have manufactured nothing but woodworking machinery. Their business has grown steadily, until they claim to be the largest exclusive manufacturers of woodworking machinery in Canada. They have experienced a large demand for machinery for the manufacture of ammunition boxes, having supplied dado machines, two-spindle boring machines for bridge blocks, five-spindle cluster boring heads for handle cleats, eighteen-spindle borers for bottoms and six-spindle borers for tops of ammunition boxes; single-spindle borers for all kinds of boring, a three-spindle attachment for boring trays in shell boxes, screw driving machines, dovetailing machines,



Cowan Chain Saw Mortiser, M256

clamps, special saw tables, etc. The demand has been so great and urgent that machines have, in some instances, been shipped by express.

The Cowan line of woodworking machinery is very complete. Illustrated herewith is their chain saw mortiser M256, which is built for shops where all kinds of light work may be called for and where speed is a high requisite. It has every possible appliance to facilitate work. The table is compound, permitting long or adjacent mortises to be made by a series of cuts without unclamping the material, a feature of special advantage for many classes of work. This machine is equipped with English-made chains, bars, and sprockets, which they claim to be superior to other makes. Their chain saw mortisers are made in three sizes, M236, M255 and M256. The R. Laidlaw Lumber Company, of Toronto, have installed five of their M236 mortisers, and in all they have sold over two hundred.

Spruce and Pine

for

Shell Boxes

and other purposes

Dressed as Required, Spruce and Pine—1914-15 cut

Merchantable 1 x 4 x 10/13
Merchantable 1 x 5 x 10/13
Merchantable 1 x 6 x 10/13
Merchantable 2 x 4 x 10/13
Merchantable 2 x 5 x 10/13
Merchantable 2 x 6 x 10/13
Merchantable 2 x 7 x 10/13
Merchantable 2 x 8 x 10/13
Merchantable 2 x 10 x 10/13

all can be be P.1 or 2S. and matched.

V Joint or Novelty siding. Approximately 60 to 75 per cent. 12/13 ft.

Roofing P 2 S and Matched—1914 cut

1 in. x 4 in. up x 8/13. Approximately 60% 12 and 13 ft.

First Quality and Clear Spruce

1 x 4 in. up x 6/13—1915 cut.

Cull Spruce—1914 cut

3 in. x 4 in. up x 10/13 3 in. x 9 in. x 10/13

Blair & Rolland

Limited

Wholesale Lumber and Pulpwood

Coristine Bldg.

Montreal - Que.

Fenderson Spruce

Messrs. John Fenderson & Company, of Springfield, Mass., and Sayabec, Que., write us that they have on hand a good stock of dry spruce boards, and also a fair stock of thoroughly air-dried birch that was cut one or two years ago. They say that any manufacturer of shell boxes who has difficulty in getting well seasoned lumber, will find his difficulties "wafted away" if he will buy Fenderson spruce. Their Matapedia Valley spruce, while small in size, is the soundest knotted spruce that grows in Canada. They are in position to dress seven or eight cars per day of shell box material, and are supplying such of the shell box users as favor them with orders, with thoroughly dry and well dressed stock. Their Fenderson seasoning and dressing has been a household word amongst the retail lumber dealers of Ontario for many years.

Shell Box Specialties

The Vokes Hardware Company, Limited, 40 Queen Street East, Toronto, are one of the few firms specializing in complete shell box equipment. They control the entire output in this line of the two factories of the British American Hardware Manufacturing Company, and are fully equipped to handle orders of any size and extent in the shortest possible notice for wire rope and tarred Manilla rope handles, steel bands for all sizes of boxes, wood screws, wire nails, staples, corrugated joint fasteners and housline. All the equipment supplied by the firm is approved by the Shell Inspection Department. It is a decided advantage to shell box manufacturers to be able to purchase all supplies needed from one source, and particularly from a firm with such a complete equipment as the Vokes Hardware Company.

"Acme" Corrugated Fasteners

Corrugated fasteners are being used more and more extensively in the woodworking industries, particularly the past year, in connection with shell box manufacture, for securing the knots in the lumber and in other different ways approved by the shell inspection committee. The "Acme" fasteners sold by J. E. Beauchamp & Company, Coristine Building, Montreal, have had a particularly large sale in this connection. Acme fasteners in both the saw edge parallel and plain edge parallel are made either in cut-lengths as scheduled in the price list or in coils for use in a driving machine. In coils the fastener is sold by the pound.

Machinery for Handles

The Preston Car & Coach Company, Limited, Preston, Ont., are working on a shell box contract. They have devised an interlocking punch for making the handles. This punch presses the ends of the handles after they are loosely spliced together. By this method one man can make from 800 to 1,000 handles a day. Another machine which they find very efficient is used for stretching and shaping handles after they are wrapped with marlin.

How to Dispose of Shavings

A box company writes the Canadian Woodworker as follows: "We have started a box factory and are using electric power. We can find a market for the sawdust and cuttings, but we are unable to get rid of our shavings unless we put in a burner. Can you suggest any use that could be made of them, or any by-product we could manufacture from them? Do you know of a press being manufactured which would bale them?"

The Editor of the Canadian Woodworker will be glad to hear from any reader who has a suggestion to offer in connection with the questions of our correspondent.

Getting Full Value

Certain subscribers to the "Canadian Woodworker and Furniture Manufacturer" write us almost every month about something which appears in our columns. They read every issue—the advertisements as well as the practical articles—and in this way they obtain the greatest benefit from their subscriptions. This should be the policy of every subscriber. Read the paper carefully, write the Editor about any question related to the woodworking or furniture trades, exchange ideas with those having common interests.

When you have orders to place, get quotations from the men who show that they want your business. Shell box machinery and supplies are extensively advertised in this issue. These manufacturers and dealers are leaders, and their products are of the highest quality. They are deserving of our patronage. Give them your business if they can compete on quality and price.

Passing of a Noted Machinery Builder

The recent death of Baxter Doddridge Whitney, at the advanced age of ninety-nine years, has removed one of the few surviving notable characters of the early American machinery building era. Mr. Whitney was born in Winchendon, Mass. As a boy he became deeply interested in machinery, and was fond of experimenting in the repair shop connected with his father's woolen mill. It was there that he took his first steps in his education as a machinist. At ten years of age he constructed a sawmill run by water power from a small stream near his home. At the age of sixteen he made an 18 x 6 ft. engine lathe, designing and making the pattern and machining the casting. His career as a machinery builder covers a period of about eighty years.

His first patent covered a machine for stretching wrinkles out of cloth in the process of fulling. In succession he built machinery for making pails, looms for weaving cashmere, steam jigs, wood planing machines (first practical cylinder planer built). He established himself as a manufacturer of surface planers in 1846. The first wood scraping machine was constructed in 1857, and a few years later the back knife lathe was built.

His machinery is known and recognized as of superior make throughout the world, each piece built on honor. During the Civil War he built machinery for making stocks for muskets and rifles, and at the present time the plant is running day and night making machinery used in the manufacture of rifles.

In 1900 Mr. Whitney retired from active business, giving the management of the concern to his son, William M. Whitney. As manufacturers of woodworking machinery, the firm of Baxter D. Whitney & Son is most favorably known throughout the United States and Canada.

Specialists in

Complete Shell Box Equipment

Your profits in the manufacture of shell boxes depend upon the efficiency of your factory and your ability to purchase supplies that are right in price and quality. The repeat orders which we have received are proof of the satisfaction we give our customers.

Wire Rope and Tarred Manilla Rope

Shell Box Handles

Steel Shell Box Bands

for all sizes of boxes

Wood Screws, Wire Nails, Staples, Corrugated Joint Fasteners and Housline

ALL SHELL BOX EQUIPMENT APPROVED BY SHELL INSPECTION DEPARTMENT

Right Goods Quick Delivery Right Prices

Let us quote on your complete requirements and submit samples.

Manufactured by The British American Hardware Manuf'g Co.

FOR SALE BY

The

Vokes Hardware Co.

Limited

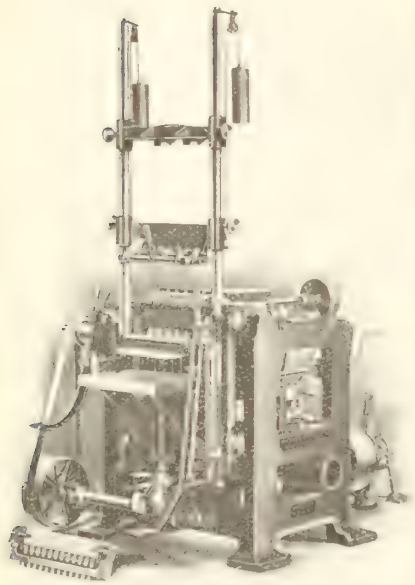
40 Queen St. East

TORONTO

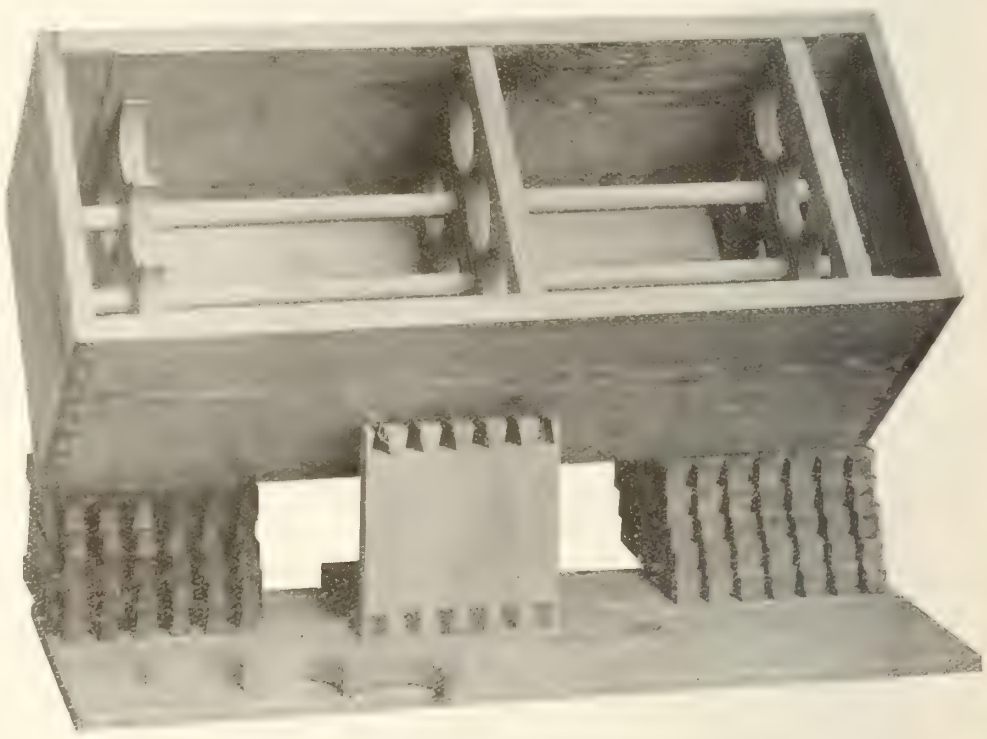
The Open End Dovetail Machine

*By O. C. Wysong

Possibly nothing has puzzled the shell box manufacturers more than the question how to get a dovetail joint that will meet the requirements and still be done at a cost that makes the business profitable. Practically the same thing can be said of boring the partitions for the boxes. It seemed that no one had given the question much thought until the rush came for shell boxes, then the box manufacturers commenced looking for machinery that could be had at short notice. There seemed to be nothing on hand that would exactly fill the bill or make the joint exactly as specified, namely, an open end dovetail; the closed end dovetail, or furniture dovetail, as it is sometimes called, was allowed because machines of this class could be had new and second-hand, and it was a case of get busy as soon as possible. But it is a fact that neither the joint nor the machine is adapted to this work, for many reasons, principally because the process is entirely too slow.



No. 211 Patent Multiple Dovetailer.



Completed shell box, showing dovetail.

Herewith is shown a machine made in the United States, and which is being used by some of the box makers in Canada. This machine is the result of 25 years of hard study and experimenting, costing many thousands of dollars to perfect. It was originally designed to fill the long-felt need of better and faster dovetailing in a furniture factory, and to this end it has met with favor among the best and largest manufacturers of furniture.

When the demand came for an open-end dovetail, the manufacturers of this automatic dovetailer got busy and produced the open-end dovetail on this machine, as can be seen in the illustration of a shell box shown herewith. The machine has from two to five times the capacity of the ordinary dovetailer, according to the style of work desired.

The builders of this machine are the Wysong & Miles Company, of Greensboro, N. C., who also make a specialty of mortising, sanding and boring machines, and are giving much attention to the special boring cutters for boring partitions in shell boxes.

Garlock Machinery

The Garlock-Machinery, 197 Wellesley Street, Toronto, have been making a specialty of shell equipment. They are the Canadian representatives of the American Woodworking Machinery Company, and have furnished large quantities of equipment for shell box work, the machines covering the regular run of nailers, screw drivers, saws, surfacers, etc. In addition to the regular line of tools they have supplied special tools, amongst which are the following of especial importance:

Fast feed moulder—for sizing, surfacing, jointing, tonguing and grooving at a high rate of speed at one operation. This machine is equipped with slip on and off heads for quick change, and all belts have tighteners.

Multiple spindle boring machine—for boring four or six holes at one operation. This machine is fitted with double side drive centers, consequently all holes bored are of the same centers; it is fitted with automatic as well as hand feed.

Single boring machine—for boring countersunk holes in the center bridge of the fixed ammunition boxes; the table raising screw and spindles on this machine are made special size, and the bit shank is received into the spindle itself, which in this case acts as a chuck. This machine is also fitted with a special oil catcher, preventing the oil from dropping onto the work.

Two saw sizing machines—for use on ammunition box work, for trimming the fixed ammunition boxes to absolute size.

The announcement of Garlock-Machinery will be found on page 77 of this issue. Mr. Wm. Garlock, Jr., is the head of the company.

Shell Box Equipment

and

General Wood Working Tools

We have in stock at Toronto for immediate shipment, for use on Fixed Ammunition Boxes:—

Cowan Special Dado Machines, for grooving sides

J. & C. 12 Spindle Dovetailers

J. & C. Case Clamp for squeezing

also a Used Advance 15 Spindle Dovetailer—in very good condition

We have installed several plants for shell box work.

Let us co-operate with you in selecting and laying out your tool equipment.

Our Services are at your disposal.

We handle all kinds of wood-working machinery, including the complete line of the

AMERICAN WOODWORKING MACHINERY CO.
ROCHESTER, N.Y.

and the line of special boring machines of

M. L. ANDREWS & CO., CINCINNATI, OHIO

Garlock - Machinery

197 Wellesley Street - - Toronto

Telephone North 6849

News of the Trade

The Windsor Casket Company, Limited, of Windsor, Ont., have obtained a charter.

Mr. Chalmers Redden, of Kentville, N. S., has purchased the planing and moulding mill at Kingsport, N. S.

The W. A. Freeman Company, Limited, of Hamilton, Ont., have decided to go into the manufacture of refrigerators.

Nathan Calder, Listowel, Ont., is contemplating the erection of a planing mill to cost $5,000, 60 x 25 feet, brick construction.

The office and factory of the Gold Medal Furniture Manufacturing Company, Toronto, was damaged by fire to the extent of about $75,000 early in December.

The sawmill and factory belonging to M. Arthur, St. Antoine, P. Q., was recently destroyed by fire. Mr. Arthur will rebuild and will require a complete outfit of machinery.

The woodworking factory belonging to W. H. Carson, Oakville, Ont., was recently destroyed by fire at a loss of $5,000. Mr. Carson will have the building repaired at once.

A report from Rainy River, Ont., states that a new sawmill, planing mill, shingle factory, box factory, etc., will be operated there in the near future. It is expected that the building will be erected this winter.

One of Waterloo's growing manufacturing concerns is the wood-turning plant of Mr. George Guentzler. He is building an addition 25 x 30 feet in order to meet the demands of his growing business.

Mr. Harry Sykes, of the Thomas Organ Company, Woodstock, Ont., has been elected president of the Canadian Piano and Organ Manufacturers' Association. The Association held its annual meeting at the National Club in Toronto on November 15th.

The British Columbia Match Company, Limited, has been incorporated at Vancouver with a capital stock of $20,000. The new company is acquiring the business now being carried on by James B. Hall and Walter Hall under the style of the British Columbia Match Company.

Mr. Thomas Bailey, a well-known cabinet-maker, of Georgetown, Ont., and the oldest resident of that town, died on November 10th at the advanced age of 88 years. The late Mr. Bailey was born in Leeds, England. He came to Canada in 1850, the voyage taking seven weeks. He had lived in Georgetown since 1853.

In the construction of bi-planes, aeroplanes and seaplanes, good lumber, light but staunch, is used in great quantities, and one result of the war has been to cause a demand for this class of lumber. It has been found that clear spruce is specially suited for the purpose and large quantities of this clear spruce are being shipped to England.

The new mill of the Hardwood Specialties Limited, at Pembroke, Ont., replacing the one destroyed by fire in August, has commenced operation. The Radcliff Saw Manufacturing Company, of Toronto, secured the full order for saw equipment for the mill, including fifteen 8-inch band saws, two 60-inch inserted tooth saws, four 60-inch cut-off saws and 200 small circulars.

By a recent gigantic merger in the carriage trade, the Carriage Factories, Limited, assumed control of the Heney Harness and Carriage Company of Montreal, the Tudhope Carriage Company of Orillia, the Munro, McIntosh Company of Alexandria, the Canada Carriage Company of Brockville, the McLaughlin Carriage Company of Oshawa, the Dominion Carriage Company, Toronto, and the R. J. Latimer and Company, of Montreal. Financially, the new company will be one of the strongest of its kind in Canada. The directorate comprises men of character and international reputation.

The Indian Lake Lumber Company, Limited, has been incorporated with head office at Winnipeg, Man., and capital stock of $100,000, to carry on business as wholesale and retail lumber merchants, to own and operate sawmills and planing mills and to manufacture and deal in all products of the forest.

Mr. L. A. Leach, formerly of Smith's Falls, Ont., and now of Ottawa, and Mr. Byron Moses, an Ottawa manufacturer, were in Smith's Falls recently endeavoring to interest local capital in a cheese-box factory, the head office of which is to be at Ottawa. The company is capitalized at $90,000. The location for the factory has not been decided upon yet.

Wilson Brady, Limited, has been incorporated with head office at Vancouver, B. C., and capital stock of $50,000, to carry on business as lumber manufacturers, timber merchants, and to manufacture and deal in timber, sawlogs, lumber, shingles, lath, sash, doors, portable houses, boxes, and all articles and materials in the manufacture whereof timber, lumber or wood is used.

The Canada Hardwood Manufacturing Company, Limited, Deseronto, Ont., have started work upon an addition to their woodworking mill. They are making additions to the old mill building of the Rathbun Company and are also making minor alterations. Mr. G. A. Turner is the chief party interested. He will be purchasing sawmill and woodworking machinery, automatic lathes, belting, etc.

After nearly half a century of life in Woodstock, Ont., during which time he built up the Karn Organ and Piano Company (now the Karn-Morris Company), Mr. D. W. Karn has left the town to take up his residence in Toronto. He was born in the Township of North Oxford in 1843, where he passed through all the vicissitudes of bush life and had to clear his farm of timber. In 1869 he removed to Woodstock and entered business with a Mr. Miller, who was constructing on an average one cabinet organ a week. In the early part of 1872 he bought out Mr. Miller, and subsequently Gunn & Stabler. His business increased rapidly, and soon he had to procure larger premises, adding other buildings and machinery till it became one of the largest factories in Canada. On three different occasions the premises were badly damaged by fire, and twice were completely destroyed—with no insurance in the first instance. Mr. Karn, however, was undismayed, and after each loss set to work and got new and improved machinery for the better carrying on of his business. Prior to the entire destruction of the factory in the centre of the town he had purchased the large premises known as the Woodstock Hotel, which had been intended for a separate piano factory. He had, however, to transfer the organ business there, adding very largely to the plant. Later on he erected a large pipe organ factory, and also took up the manufacture of piano-players. About thirty years ago the industry had reached a high state of development. Mr. Karn sent over a big exhibit to the International Exhibition in London, England, and as a result his firm received an order for three thousand five hundred organs, the largest order ever given for reed organs. This gave great impetus to the business, and branches were opened in London and Hamburg. When Mr. Karn retired from business, six years ago, the number of instruments manufactured by his firm had reached seventy-five thousand. The old Karn Company was somewhat unique among the manufacturing concerns in the province, in that it never received a cent from the municipality to aid in its development. Mr. Karn developed his business simply by hard work

and intelligent effort. It is an interesting fact that the factory ran continuously for forty years without ceasing operations, except for stock-taking periods, and even then all the men were not laid off.

WANTED

Assistant Editor for this publication; must know the practical side of the woodworking business and be able to express his ideas in writing. Good opportunity.

CANADIAN WOODWORKER
& Furniture Manufacturer
345 Adelaide St. W., Toronto

Paint and Varnish Salesman

Young man, master painter of thirteen years' experience in paints, stains and varnishes, desires position as traveller for paint and varnish house. Can give good recommendations.
12 Box 24, "Canadian Woodworker," Toronto.

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Registered Patent Attorney
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The business of Manufacturers and Inventors who wish their Patents systematically taken care of is particularly solicited.
Ask for new free booklet of complete information.

"CLARENDON" Finish

The High Grade, Well Manufactured

Soft Short Leaf Yellow Pine

Band Sawed - End Trimmed
Kiln Dried

WISTAR, UNDERHILL & NIXON
Philadelphia, Pa.

Second-Hand Woodworking Machines

Band Saws—26-in., 36-in., 40-in.
Jointers—12-in., 16-in.
Shapers—Single and double spindle.
Re-Saw—42-in. American.
Lathes—20-in. with rests and chisels.
Surfacers—16 x 6 in. and 18 x 8 in.
Mortisers—No. 5 and No. 7 New Britain.
Rip and Cut-off Saws; Molders; Sash Relishers, etc.
Over 100 machines, New and Used, in stock.

BAIRD MACHINERY COMPANY,
8 123 Water Street, Pittsburgh, Pa.

Second-Hand Woodworking Machinery

Baluster Machine, Mattison No. 8.
Blind Rabbeter and Jointer, American.
Boring Machine, single spindle horizontal, Pryibil.
Boring Machine, four spindle horizontal, Garden City.
Dovetailing Machine, 10 spindle Advance.
Dowel Machine Double, Crescent, power feed.
Dowel Machine, six heads, Fay & Egan, power feed.
Glue Heater, instantaneous, Zimmerman.
Glue Heater, new 5-gallon Wetmore.
Glue Heater, 45-gallon, power agitator, Howard.
Glue Spreaders, 2 Francis 37 in., double roll.
Jointers, 24 in. Clement, 16 in. Oliver, 16 in. Smith.
Lathes, back knife, two Clement No. 2, 40 and 48 in.
Planer, single 20 x 6 in. Lehman.
Planer, single 26 x 8 in. Rowley & Hermance.
Planer, single 32 x 7 in. L. Power & Co.
Planer, double 24 x 6 in. No. 4 Williamsport.
Planer, double 30 x 4 in. Whitney.
One 26 x 14 in. Endless Bed Double Surfacer, L. Power Co.
Pulley Mortiser, Enterprise.
Ripsaws, self feed, No. 1 American and Graham.
One 42 in. Invincible triple drum Sander.
One 42 in. Young Bros. triple drum Sander.
Sander, belt post type, Schimmel-Reid.
Sash Relisher and Mortiser, American.
Shapers, double spindle, 1 Clement, 2 American, 1 Fay & Co.
Swing Saw, parallel, No. 5 Pryibil.
Tenoner, No. 2½ American, single heads, copes and cut-off.
Wysong & Miles No. 173 Belt Sander with No. 174 attachment.
Boring machine, three spindle, horizontal.

FRANK TOOMEY, Inc.
131 N. Third Street, - PHILADELPHIA, PA.

7% INVESTMENT 7% PROFIT SHARING
Sums of $100, $500, $1000 and up. Safe as any mortgage.
Business at back of this Security established 28 years.
Send for special folder to
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SHELL BOX MATERIAL

All Sizes and Large Quantities Always in Stock
QUICK SHIPMENT GUARANTEED

Full Stock—

Spruce, Pine and Hardwoods

Write or Phone at our expense

FESSERTON TIMBER CO., LIMITED, 15 Toronto St., **TORONTO**
Phone Main 3658

Dovetailer for Ammunition Boxes Now and Furniture Later

The exceptional strength of a dovetailed joint has resulted in this type of joint being specified by the ammunition committees, both in England and Canada, on all of the latest ammunition shell box contracts. The Dovetailing Machine Department in the immense plant of the J. A. Fay & Egan Company at

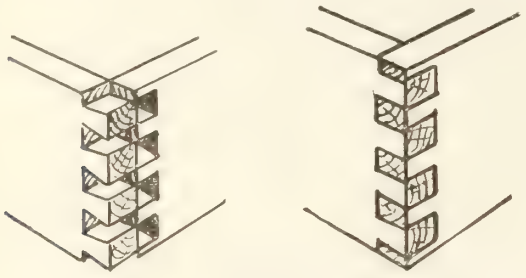
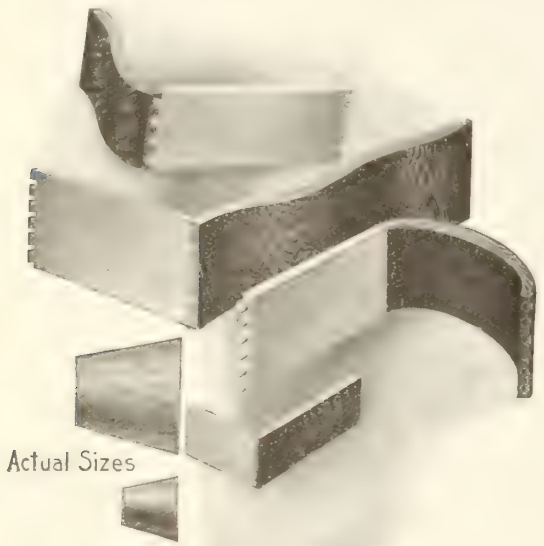


Fig. 1. - Ammunition Box Dovetail.

Cincinnati, Ohio, has been working at forced capacity to supply the demand for this machine, and daily shipments by express has been the rule during the past few weeks.

These new Fay-Egan dovetailers can be used now for making the ammunition box dovetails as shown in Fig. 1, and can later be used without change in



DOVETAILING

Fig. 2.—Plain Furniture Dovetail.

construction for furniture work, making either the old style open or plain dovetail, as shown in Fig. 2—or the new style invisible blind dovetail as shown in Fig. 3, and particularly because this machine can make the last named type of dovetail with an off-set for making dust-proof drawers. In Fig. 3-B are shown the two parts of this blind dovetail. Fig. 3-C shows the invisible dovetail with the plain joint, and Fig. 3-A shows the invisible dovetail with dust-proof off-set. This last named is the style of joint that is now being demanded by the dealers and purchasers of high grade furniture.

Another big advantage of the new Fay-Egan dovetailers is the fact that they can be used for making dovetail joints in plain, swell or serpentine front work without change.

The purchaser of one of these machines, therefore, is not only getting a machine that will turn out his ammunition box dovetail work at the lowest possible figures, and in a manner that will pass the most rigid

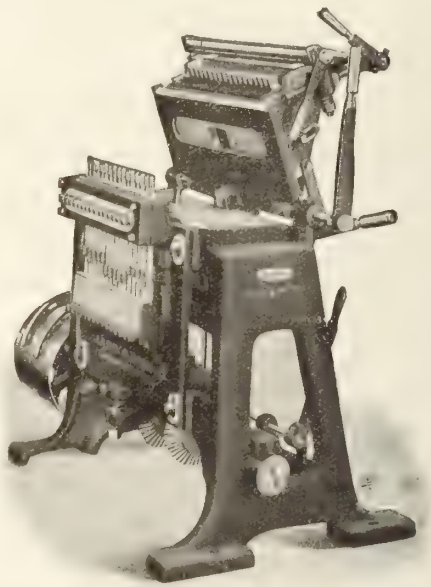
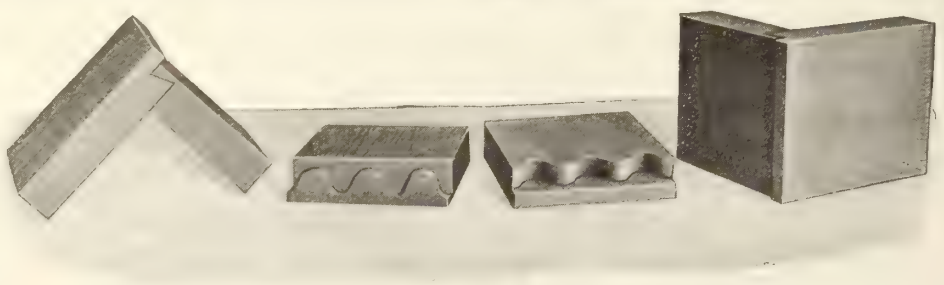


Fig. 4.—Fay & Egan No. 201 Gang Dovetailer, showing accessibility of cutters for sharpening.

inspection, but he is also preparing himself to realize a big profit on his investment after his contracts have expired and he goes back to his regular line of work.

A reference to the illustration of this machine closed up ready for operation in the display section of this issue shows it to be constructed on the order of a high grade automobile with the mechanism totally enclosed, all gearing cut from the solid and running in gear cases filled with grease. The bearings for the spindles are all aluminum bronze, cast under hydraulic pressure and are of the reservoir self-oiling type.

Fig. 4 shows a valuable operating feature of this machine, the throw back top arrangement, whereby the entire top mechanism can be thrown clear of the cutters, making them easily accessible for quick and accurate sharpening and setting. These machines are made with nine, twelve and fifteen spindles.



(a) (b) (c)

Fig. 3. - The new Fay & Egan Invisible or Blind Dovetail, either plain or dust-proof offset joint.

KRAETZER Gum CURED

The Most Versatile of Woods

Gum Lumber for Shell Boxes

Gum lumber, when manufactured, treated and handled by our methods, is particularly well suited to the manufacture of ammunition boxes as well as many other lines of manufacture.

For cabinet work, interior trim and similar uses it is unsurpassed, possessing a beauty and character that is not excelled by any wood—regardless of price.

It is equally desirable for wagon boards, enameled and painted work of all kinds, being a close grained wood and taking and retaining a finish better than other woods used for these purposes.

Remember, ours is a **distinctive product**; it is **not** just Gum lumber. By our methods **we create** its value and make it a wood that can be used more satisfactorily and with greater confidence than any other American hardwood. More than 75 per cent. of our regular patrons are people who had previously abandoned the use of **ordinary** Gum on account of being unsuited for their purpose.

See the brand on every board

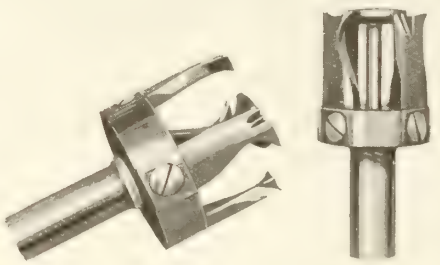
THE KRAETZER-CURED LUMBER CO.

That's your guarantee; our mutual protection

The Kraetzer-Cured Lumber Company

Moorhead, Miss.

Sales Office—CINCINNATI, OHIO



Inserted Tooth Cutters

for Shell Box Work

Machine Centre Bits

and Special Cutters

GALT KNIFE CO., LIMITED

99 State Street

GALT - ONT.

Box Machinery

1—No. 8 Morgan Lock Corner Cutter.
1—No. 2 Morgan Setting-up Machine.
1—Morgan Trimmer.
1—No. 12 Morgan Nailer, with cleating attachment.
2—No. 9 Morgan Plain Nailers.
1—Chase Horizontal Resaw.
1—Chase Vertical Resaw.
1—46" Mershon Ideal Band Resaw.
1—44" E. & B. Holmes Circular Resaw.

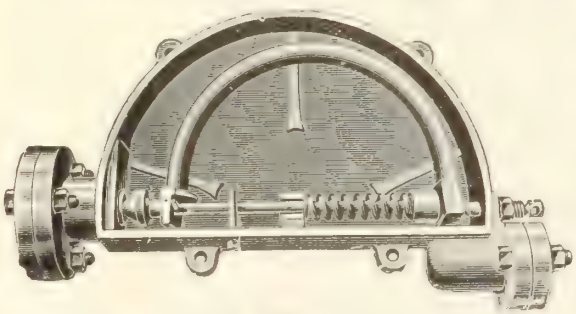
Over five hundred machines in stock.

Write for a copy of "Wayne List" issued monthly.

All machines furnished in condition to do same work as when new.

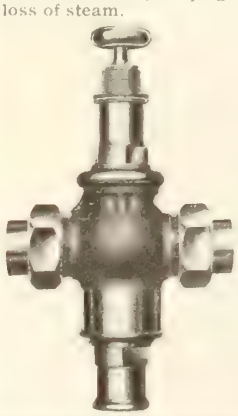
Wayne Machinery Company
Fort Wayne, Indiana

J. M. T. STEAM GOODS and SPECIALTIES



HEINTZ STEAM TRAP

Think of fortunes lost in wasted steam. The Heintz device will automatically control the condensation from Dry Kiln Coils or other heaters, keeping them entirely free of water without loss of steam.



J.M.T. REDUCING VALVE

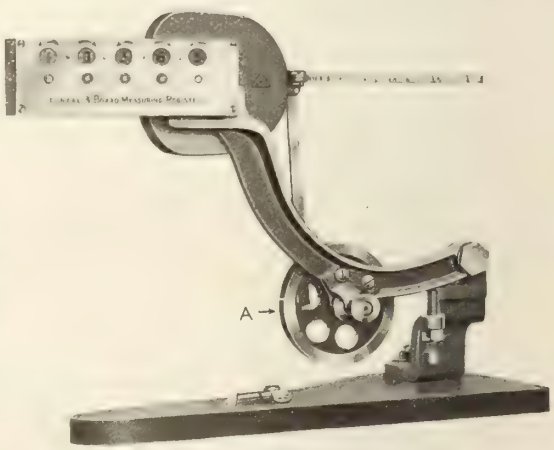
THE J.M.T. REDUCING VALVE

for maintaining a uniform low pressure from a high pressure steam or air line. The J.M.T. is the ultimate valve because it does all that a pressure-reducing valve possibly could do. It makes no difference how the high pressure may vary, the J.M.T. will keep the low pressure constant.

are made from the best materials by experienced workmen.

This, combined with modern designs to meet present day requirements, results in goods of the highest class.

Every article tested before leaving our factory.



THE MORRISON LUMBER MEASURING REGISTER

can be used in the saw mill, planing mill, woodworking plant furniture factory and retail lumber yard. It will automatically and continuously measure your stock, giving the results in lineal or board measure as desired. It can be attached at a moment's notice to the end of any machine in the factory, or can be used in the yard. It is solidly constructed, nothing to get out of order, and fully guaranteed to give accurate results when opened according to directions. A Labor Saver that saves you money.

The James Morrison Brass Mfg. Co., Ltd.

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STEEL BANDS FOR SHELL BOXES

We are making excellent bands, officially inspected and approved. We are making deliveries as agreed.

You can save real money, also a lot of worry and trouble by linking up with us for your band supply. Ask some of our customers. (Names on request.)

The Metallic Roofing Co., Limited, Toronto, Ont.

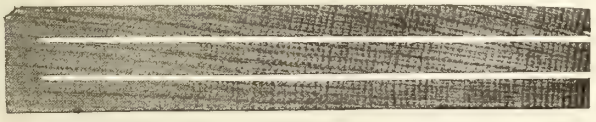
ALSO MANUFACTURERS OF "QUALITY FIRST"

Sheet Metal Roofing, Siding, Ceiling, Skylights, Ventilators, Corrugated Iron

GRAND RAPIDS VAPOR KILN

Casehardening?

You are casehardening your lumber if you don't use a **Grand Rapids Vapor Kiln.** The vapor is a dense hot fog surrounding the lumber and keeps the surface soft and moist while the center dries. Lumber free from casehardening will show this test.

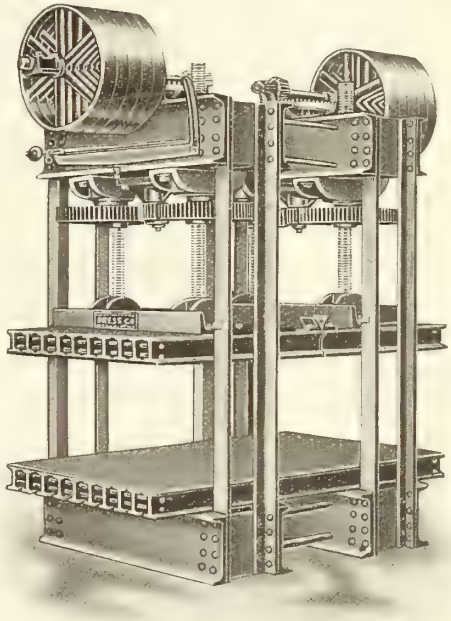


Ask for "dope" on how to prevent casehardening.

1200 kilns in successful use.

GRAND RAPIDS MICHIGAN

VENEER PRESSES



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18 Tansley Street, MONTREAL

The Canadian Woodworker and Furniture Manufacturer covers a specialized field. It represents maximum value to its subscribers.

Subscription price $1.00 per year.

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For Veneer and Veneer Drying

Made in Canada

William R. Perrin Limited

Toronto

Spruce and Pine Lumber

for

Shell Boxes

and Other Factory Purposes

Let us quote you on your requirements

Complete stocks always ready for prompt shipment

SEND US YOUR INQUIRIES

Austin & Nicholson

CHAPLEAU, ONT.

Immediate Shipment

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Thoroughly Dry and Well Manufactured

1 car 4/4 1s and 2s, Plain White Oak.
4 cars 4/4 No. 1 Common Plain White Oak.
2 cars 4/4 No. 2 Common Plain White Oak.
1 car 4/4 No. 1 Common and Better Plain White Oak. Worm holes no defect.
1 car 6/4 No. 1 Common Plain White Oak.
6 cars 4/4 S. W. Chestnut.
1 car 5/5 S. W. Chestnut.
4 cars 6/4 S. W. Chestnut.
1 car 8/4 S. W. Chestnut
3 cars 4/4 No. 3 Common Chestnut.
1 car 4/4 No. 1 Common and Better Chestnut.
½ car 8/4 No. 1 Common and Better Chestnut.
1 car 4/4 Saps and Select Poplar.
2 cars 4/4 No. 2 Common and Better Poplar.
1 car 5/4 No. 2 Common Poplar.
1 car 6/4 No. 2 Common Poplar.
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We solicit your inquiries on special cut bill Oak.

Mill at Holly Junction, W. Va.

Write at once for Quotations The Price is Right

The Imperial Lumber Co.

COLUMBUS - OHIO

"H. J. B." Electric Rubbing Tool

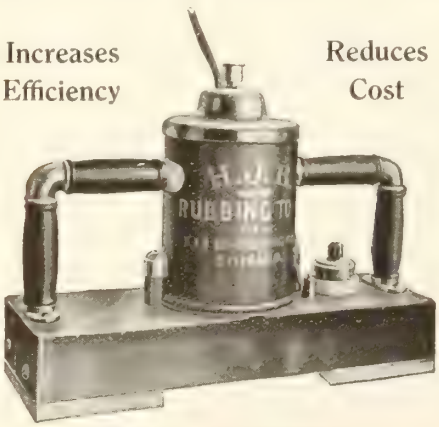
For Polishing, Sanding, Etc.

Every furniture maker knows the unsteady results of the human rubbing machine.

The "H. J. B." rubbing tool will give absolutely uniform results in your finishing department. It is portable, simply constructed, self-oiling and never gets tired.

Increases Efficiency

Reduces Cost



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The Atlantic Lumber Co.

Manufacturers and Wholesale Dealers

American and Canadian Hardwood Lumber and Mahogany, Quartered and Plain, White and Red Oak a Specialty.

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Mills: KNOXVILLE, TENN., WALLAND, TENN.
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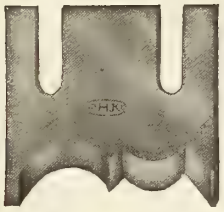
They Hold Their Edge



Peter Hay Machines Knives

Peter Hay knives are made of special quality steel tempered and toughened to take and hold a keen cutting edge. Hay knives are made for all purposes.

Have you our catalogue?

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"ACME" Casters Outlast The Furniture

The choice of trimmings and casters may be a deciding factor in the classification of your furniture. Use "Acme" Ball-Bearing or Non Ball-Bearing Casters and you will be known as a maker of the best furniture.

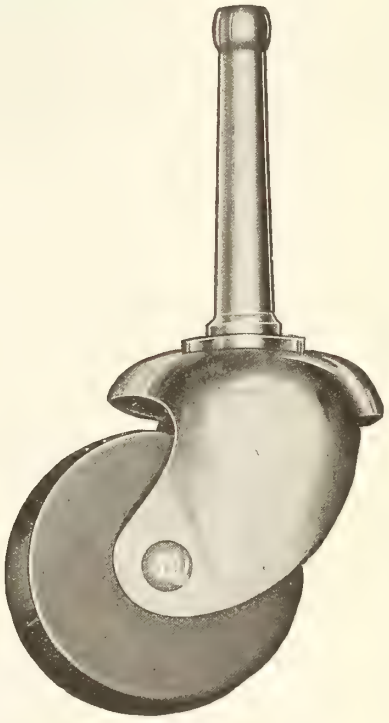
"Acme" Casters usually outwear the furniture they carry. They never bend, loose their wheels or develop flat sided wheels.

We solicit your enquiries and will be pleased to have our Canadian representative call and discuss any special Casters or Period Trimming you may require.

Foster, Merriam & Co.

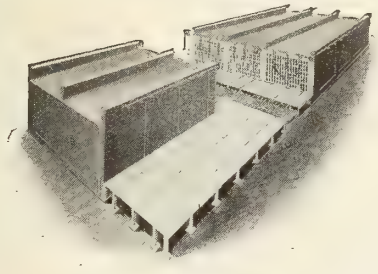
Meriden, Conn.

Canadian Representative:—F. A. Schmidt, Berlin, Ont.



"ACME"
For All Furniture

MORTON HUMIDITY SYSTEM POCKET KILNS



This is the ideal type of kiln for any firm that has numerous kinds and thicknesses of lumber to dry.

Perfect Control and **Rapid Results** build a kiln that fits your special requirements.

Write for our 3 Complete Catalogs and Special Folder-60 F.

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Dry Spruce and Birch

Good Stocks, Prompt Shipments, Satisfaction

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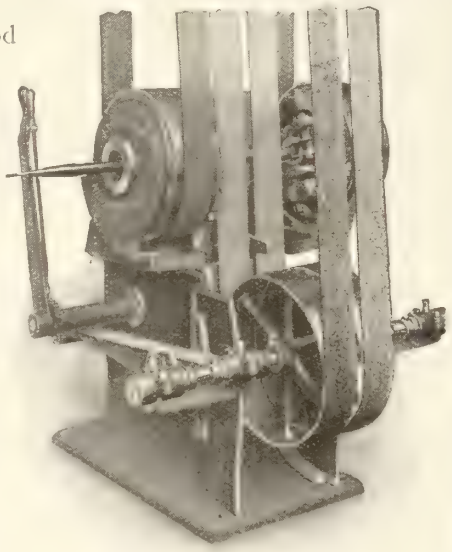
Wholesale Dealers in Rough and Dressed Lumber

Eastern Townships Bank Building
MONTREAL - - Quebec

"I will install a Nash Sander for My Round Work,"

is a mighty good New Year's Resolution.



Chair Stock,
Dowel Rods,
Shade Rollers,
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Whip Stocks,
Canes,
Ten Pins,
Veneered Columns,
Broom, Fork, Rake, Shovel and Mop Handles,
Etc.

Put it into effect, and it will help you show up a better balance sheet next December.

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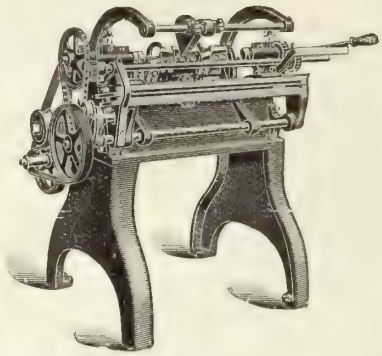


Work your waste into small handles and other small turnings.

The Ober Lathes will help you.

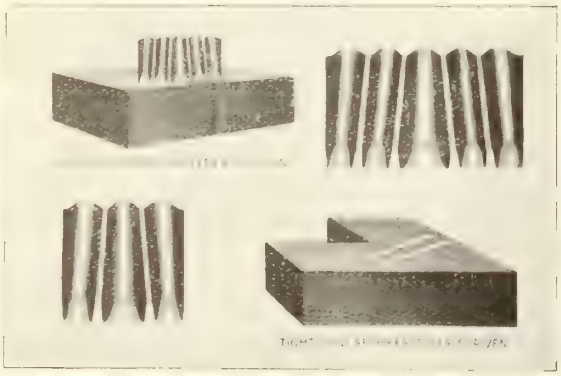
We also make Lathes for turning Axe, Pick, Sledge and other irregular handles, Whiffletrees, Neckyokes, Etc., Sanders, Rip Saws, Cut Off Saws, Chucking Machines, Etc.

Write for free catalogue No. 31

THE OBER MFG. COMPANY

CHAGRIN FALLS, O., U.S.A.

ACME



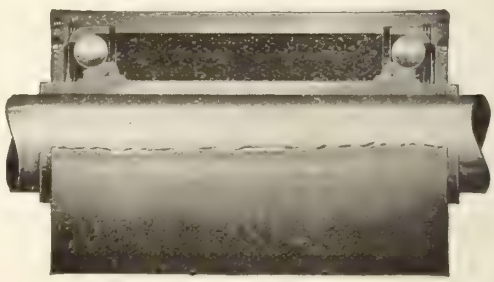
Fix The Knots in Shell Box Lumber

Every knot in your shell box lumber can be made "Sound" and passed by the use of "Acme" Corrugated Fasteners.

Get samples and prices.

J. E. Beauchamp & Co.

Coristine Bldg., Montreal



Your Loose Pulley Trouble Disappears

when installed with

CHAPMAN BALL BEARING LOOSE PULLEYS

A little vaseline once a year is all the attention and lubrication required.

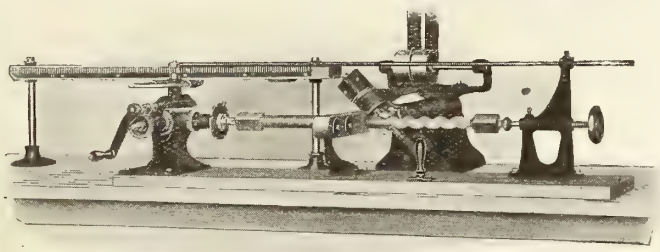
Our loose Pulleys cannot run hot and do not cut the shaft.

Write us for particulars and price list.

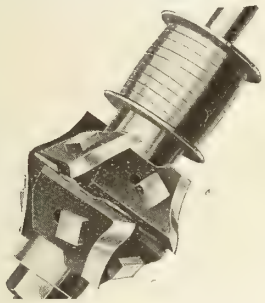
The Chapman Double Ball Bearing Co.
of Canada, Limited

339-351 Sorauren Ave., Toronto, Canada

Twist Machine



New Cutter Head for Twist Machine



Eight Knives. 30 Degrees Angle.

This machine will produce twist and spiral Columns, Balusters, Table Legs and Pedestals, Chair Posts and Spindles, etc., right and left turn.

The dividing plates will space 2, 3, 4, 6 and 8-in. Special plates furnished on application.

The feed gear set gives one turn in 1½, 3, 4½, 6, 7½ and 9-in.

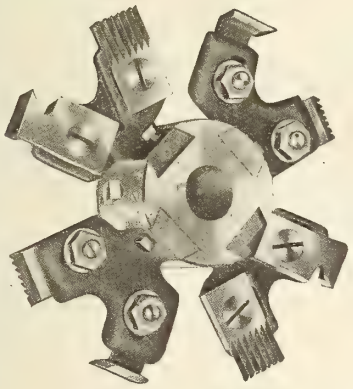
The centres will swing any diameter up to 12-in. 3 ft. between centers.

For prices and further description write

The Shawver Company

Springfield, Ohio

Mattison Adjustable Heads for Gang Dadoing



Heads are fastened to arbor by means of key or spline and set-screw — no collars or nut required. Knives are adjustable in and out so same diameter cutting circle can be always maintained.

Can be adjusted to cut different widths without removal from arbor. All the wear comes on the knives which can be replaced at slight expense—making the heads practically everlasting.

With saw or spur knives for the side cutting and shear-cutting, grooving knives for taking out the body of the groove, these heads cut faster, smoother and easier than any other make. They are strong and durable for accurate cutting.

Mattison Machine Works

Beloit, Wisconsin, U. S. A.

The 100% Sanding Equipment

Good sanding machines properly cared for—good operators backed up by the best Garnet Paper and Cloth you can get and you will come mighty near to having the ideal sanding conditions.

Carborundum

Brand Garnet Paper and Cloth

Cut clean and quick—they are coated with Hard, Sharp, Clean Garnet that has the life.

They Cut the Cost of Sanding

Every inch of paper and cloth, every bit of glue used in their manufacture, is of the highest possible quality.

Send for sample sheets.

THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.

New York Chicago Boston Philadelphia Cleveland Cincinnati Grand Rapids Milwaukee

The "Canadian Woodworker" Buyers' Directory

For Alphabetical Index see page 20

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The Carborundum Co., Niagara Falls, N.Y.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass

BAND SAW FILING MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

BAND SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto.
Pryibil Machine Co., P., New York City.
Shawver Company, Springfield, O.

BAND SAW MACHINES
Berlin Machine Works, Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Williams Machinery Co., A. R., Toronto, Ont.

BAND SAW STRETCHERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

BELT LACER
Clipper Belt Lacer Co., Grand Rapids, Mich.

BENDING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
McKnight & Son Co., L. G., Gardner, Mass.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.

BLOWERS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

BLOW PIPING
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

BORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Galt, Ont.
Cowan & Company, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock Machinery Company, Toronto, Ont.
Jackson, Cochrane & Company, Berlin, Ont.
Nash, J. M., Milwaukee, Wis.
Pryibil Machine Co., P., New York.
Reynolds Pattern & Machine Co., Moline, Ill.
Shawver Company, Springfield, O.

BOX HANDLES
Consumers Cordage Co., Ltd., Montreal, Que.
B. Greening Wire Company, Hamilton, Ont.
F. H. Hopkins & Co., Montreal, Que.
Seward Bros., Montreal, Que.

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Canada Machinery Corporation, Galt, Ont.
Cowan & Company, Galt, Ont.
Estate of Wm. S. Doig, Brooklyn, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Garlock Machinery Company, Toronto, Ont.
Jackson, Cochrane & Co., Berlin, Ont.
Reynolds Pattern & Machine Co., Moline, Ill.
St. Paul Machinery Manufacturing Co., St. Paul, Minn.
Wayne Machinery Company, Fort Wayne, Ind.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.
Wysong & Miles Co., Greensboro, N.C.

BOX NAILING MACHINES
Estate of Wm. S. Doig, Brooklyn, N.Y.

BRUSHES
Meakins & Sons, Hamilton.

CABINET PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Co., Berlin, Ont.
Pryibil Machine Co., P., New York City.
Shawver Company, Springfield, O.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

CARBORUNDUM PAPER
Carborundum Co., Niagara Falls, N.Y.

CARVING MACHINES
Curtis Machinery Corporation, Jamestown, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

CASTERS
Foster, Merriam & Co., Meriden, Conn.

CLAMPS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
Jackson, Cochrane & Company, Berlin, Ont.
Palmer & Sons, A. E., Owosso, Mich.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

COMBINATION WOODWORKER
Hutchison Woodworker Co., Toronto, Ont.

CORRUGATED FASTENERS
J. E. Beauchamp & Company, Montreal, Que.

CUT-OFF SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Co., Berlin, Ont.
Knechtel Bros., Limited, Southampton, Ont.
Ober Mfg. Co., Chagrin Falls, Ohio.
Pryibil Machine Co., New York.
Shawver Company, Springfield, O.
Simonds Canada Saw Co., Montreal, Que.

CUTTER HEADS
Berlin Machine Works, Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Mattison Machine Works, Beloit, Wis.
Shimer & Sons, Samuel J., Galt, Ont.

DADO HEADS
Elliott, W. A., Toronto.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

DOVETAILING MACHINES
Canadian Linderman Machine Company, Woodstock, Ont.
Cowan & Company, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Garlock Machinery Company, Toronto, Ont.
Jackson, Cochrane & Company, Berlin, Ont.
St. Paul Machinery Company, St. Paul, Minn.
Williams Machinery Co., A. R., Toronto, Ont.
Wysong & Miles Co., Greensboro, N.C.

DOWEL MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
Morton Dry Kiln Co., Chicago, Ill.
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

DOWELS
Knechtel Bros., Limited, Southampton, Ont.

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Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

DUST SEPARATORS
Invincible Blow Pipe Company, Toronto.
Sheldons, Limited, Galt, Ont.

EDGERS (Single Saw)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

EDGERS (Gang)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

EXHAUST FANS
Invincible Blow Pipe Company, Toronto.
Sheldons Limited, Galt, Ont.

FILES
Simonds Canada Saw Co., Montreal, Que.

FILLERS
Marietta Paint & Color Co., Marietta, Ohio.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.
Whitney & Son, Baxter D., Winchendon, Mass.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

FLUTING AND TWIST MACHINE
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

FURNITURE TRIMMINGS
Foster, Merriam & Co., Meriden, Conn.

GARNET PAPER AND CLOTH
The Carborundum Co., Niagara Falls, N.Y.
Delany & Pettit, Limited, Toronto, Ont.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto, Ont.

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Coignet Chemical Product Co., New York, N.Y.
Delany & Pettit, Limited, Toronto, Ont.
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Jackson, Cochrane & Company, Berlin, Ont.

GLUE HEATERS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.

GLUE JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Chas. E. Francis Co., Rushville, Ind.
Jackson, Cochrane & Company, Berlin, Ont.

GLUE SPREADERS
Fay & Egan Co., J. A., Cincinnati, Ohio
Jackson, Cochrane & Company, Berlin, Ont.

GLUE ROOM EQUIPMENT
Boomer & Boschert Company, Montreal, Que.
Perrin & Company, W. R., Toronto, Ont.

GLUING CAMP CARRIERS
Billstrom, Nels. J., Rockford, Ill.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio.

GRINDERS, HAND AND FOOT POWER
The Carborundum Co., Niagara Falls, N.Y.

GRINDERS (Knife)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Petrie, H. W., Toronto.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

GRINDING WHEELS
The Carborundum Co., Niagara Falls, N.Y.

GROOVING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Shimer & Sons, Samuel J., Galt, Ont.

GUARDS (Saw)
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

HANDLE THROATING MACHINE
Klotz Machine Company, Sandusky, Ohio.

HANDLE TRIMMING MACHINE
Klotz Machine Company, Sandusky, Ohio.

HANDLE & SPOKE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Co., Sandusky, Ohio.
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Ober Mfg. Company, Chagrin Falls, Ohio.
Whitby & Son, Baxter D., Winchendon, Mass.

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Reflector & Hardware Mfg. Co., Chicago, Ill.

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Blair & Rolland, Limited, Montreal, Que.
Robert Bury & Company, Toronto, Ont.
Duhlmeier Bros., Cincinnati, Ohio.
Imperial Lumber Company, Columbus, Ohio.
Geo. Kersley, Montreal, Que.
Kraetzer-Cured Lumber Co., Moorehead, Miss.
Luehrmann Hardwood Lumber Co., St. Louis, Mo.
Mowbray & Robinson, Cincinnati, Ohio.
Penrod Walnut & Veneer Co., Kansas City, Mo.
Powell Myers Lumber Co., South Bend, Ind.
Prendergast Company, Cincinnati, Ohio.
Spencer, C. A., Montreal, Que.

HUB MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

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Canadian Linderman Machine Company, Woodstock, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Knechtel Bros., Limited, Southampton, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

KNIVES (Planer and others)
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

LUMBER
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Blair & Rolland, Limited, Montreal, Que.
Gillies Bros., Limited, Braeside, Ont.
Imperial Lumber Company, Columbus, Ohio.
Wistar, Underhill & Nixon, Philadelphia, Pa.

LATHES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Klotz Machine Company, Sandusky, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Whitney & Son, Baxter D., Winchendon, Mass.

MACHINE KNIVES
Berlin Machine Works, Ltd., Hamilton, Ont.
Galt Knife Company, Galt, Ont.
Peter Hay Knife Company, Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

MITRE MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MOULDINGS
Knechtel Bros., Limited, Southampton, Ont.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Reynolds Pattern & Machine Co., Moline, Ill.

PAINTS & VARNISHES
Marietta Paint & Color Co., Marietta, Ohio.

PATENT SOLICITORS
Dennison, H. J. S., Toronto, Ont.
Lightfoot, Stanley, Toronto, Ont.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Shimer & Sons, Samuel J., Galt, Ont.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

PRESSES (Veneer)
Black Bros. Machinery Co., Mendota, Ill.
Jackson, Cochrane & Company, Berlin, Ont.
Perrin & Co., Wm. R., Toronto, Ont.

PULLEYS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Company, P., New York.

RESAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

RIM AND FELLOE MACHINERY
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.

RUBBING MACHINES
Bagg's Export Combine, Chicago, Ill.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Duplex Moulding Sander Co., Hornell, N.Y.
Elliot Woodworker Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SASH, DOOR & BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont
Shimer & Sons, Samuel J., Galt, Ont.

SAWS
Disston & Sons, Henry, Philadelphia, Pa.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Radcliff Saw Mfg. Company, Toronto, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SAW GUARDS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.

SAW GUMMERS, ALOXITE
The Carborundum Co., Niagara Falls, N.Y.

SAW SWAGES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Knechtel Bros., Limited, Southampton, Ont.
Pryibil Machine Company, P., New York.

SAW JOINTERS
Huther Bros. Saw Mfg. Co., Rochester, N.Y.

SCRAPING MACHINES
Whitney & Sons, Baxter D., Winchendon, Mass

SCROLL CHUCK MACHINES
Klotz Machine Company, Sandusky, Ohio.

SCREW DRIVING MACHINES
Reynolds Pattern & Machine Co., Moline, Ill.

SCREW DRIVING MACHINERY
Reynolds Pattern & Machine Works, Moline, Ill.

SCROLL SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.
Simonds Canada Saw Co., Montreal, P.Q.

SECOND-HAND MACHINERY
Pryibil Machine Company, P., New York.
Williams Machinery Co., A. R., Toronto, Ont.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Company, Chagrin Falls, Ohio.
Petrie, H. W., Toronto, Ont.
Pyribil Machine Co., P., New York.
Shawver Company, Springfield, O.
Shimer & Sons, Samuel J., Galt, Ont.
Simonds Canada Saw Co., Montreal, P.Q.
Whitney & Sons, Baxter D., Winchendon, Mass.

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The Carborundum Co., Niagara Falls, N.Y.

SHAVING COLLECTORS
Invincible Blow Pipe Company, Toronto, Ont.
Sheldons Limited, Galt, Ont.

SHELL BOX HANDLES
Vokes Hardware Co., Toronto, Ont.

SHELL BOX EQUIPMENT
Vokes Hardware Co., Toronto, Ont.

SINGLE SPINDLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.

SPRAYING APPARATUS
De Vilbiss Mfg. Co., Toledo, Ohio.

STAINS
Marietta Paint & Color Co., Marietta, Ohio.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass.

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Canadian Morehead Mfg. Co., Woodstock, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

STEEL SHELL BOX BANDS
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Vokes Hardware Co., Toronto, Ont.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Petrie, H. W., Toronto, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Ober Mfg. Co., Chagrin Falls, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

TABLE SLIDES
Walter & Co., B., Wabash, Ind.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jackson, Cochrane & Company, Berlin, Ont.
Pryibil Machine Company, P., New York.

TRIMMERS
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Fay & Egan Co., J. A., Cincinnati, Ohio.

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Fay & Egan Co., J. A., Cincinnati, Ohio.
Klotz Machine Company, Sandusky, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Company, P., New York.
Shawver Company, Springfield, O.
Whitney & Sons, Baxter D., Winchendon, Mass.

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Fay & Egan C., J. A., Cincinnati, Ohio.
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Marietta Paint & Color Co., Marietta, Ohio.

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Walter Clark Veneer Co., Grand Rapids, Mich.
Evansville Veneer Co., Evansville, Ind.
Hay & Company, Woodstock, Ont.
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Huddleston-Marsh Lumber Co., Chicago, Ill.
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Penrod Walnut & Veneer Co., Kansas City, Mo.
Robbins Veneer & Lumber Co., Buffalo, N. Y.
Waetjen & Co., Geo. L., Milwaukee, Wis.
Whisler, C. L., Hillsboro,' Ohio.

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Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Huther Bros. Saw Mfg. Co., Rochester, N.Y.
Simonds Canada Saw Company, Montreal, Que.

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Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

WOOD FINISHES
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Marietta Paint & Color Co., Marietta, Ohio.

WOOD TURNING MACHINERY
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Shawver Co., Springfield, Ohio..

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Fay & Egan Co., J. A., Cincinnati, Ohio.

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Cowan & Company, Galt, Ont.
Garlock Machinery Company, Toronto, Ont.
Jackson, Cochrane & Co., Berlin, Ont.
Reynolds Pattern & Machine Works, Moline, Ill.
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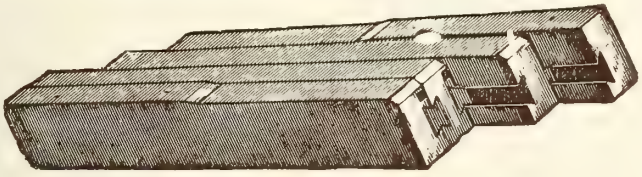

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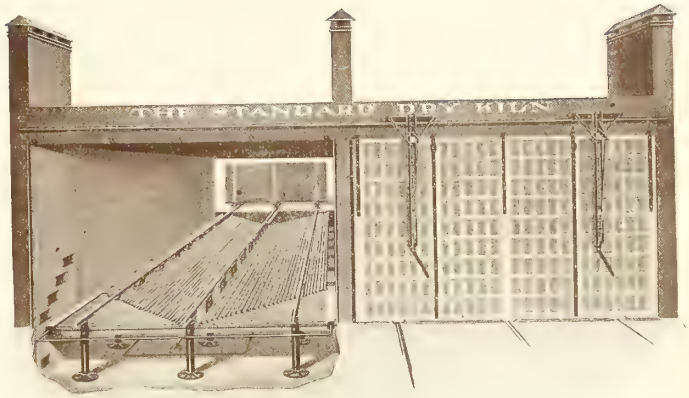

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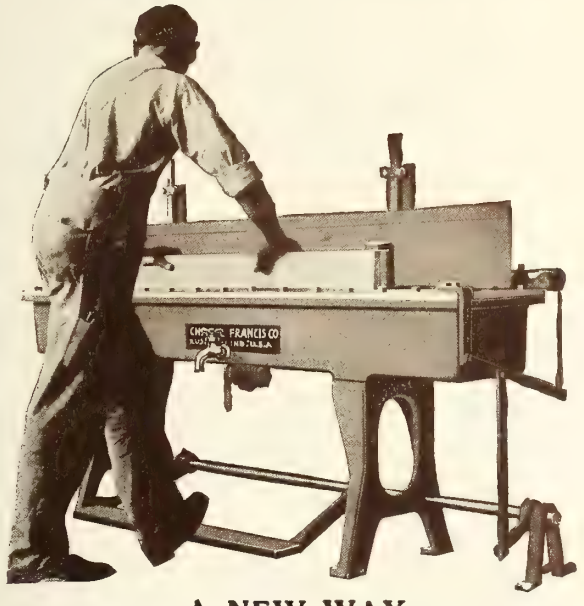

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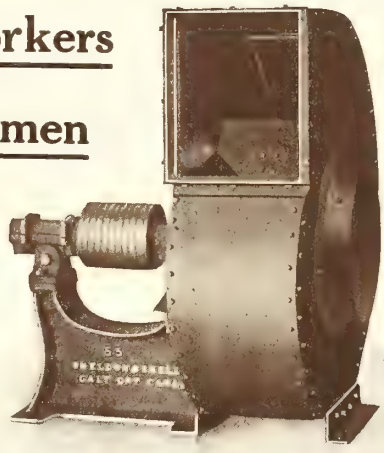

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